MEGA PROJECT BEST PRACTICES GUIDELINES

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BEST PRACTICES EXECUTIVE SUMMARY

Best Practices Executive Summary

WisDOT management undertook an evaluation of best practices in October 2011 that were in use on Mega Projects and was interested in leveraging this unique knowledge to help optimize the means and methods used for delivery of transportation infrastructure projects and programs and to facilitate knowledge transfer and future efficiency and productivity gains on future Mega Projects and throughout WisDOT as an organization.

WisDOT management evaluated and updated the Project Guidance Matrix (originally titled "Wisconsin Department of Transportation guidance Matrix for Project Organization, Tools, Management, and Reporting" and commonly referred to as "Mega Project Matrix") in 2020. This matrix lists key management resources and strategies that are critical to the success of any project while highlighting how those items differ between standard or typical improvement projects, higher profile projects and mega projects. It is intended to guide the WisDOT's decision-making process as it considers the best approach to manage a growing number of significant and high-profile projects.

The overarching goal of engaging in the deployment of best practices is rooted in a management focus on continuous improvement and refinement of the way in which WisDOT conducts business. The goal of wanting to deliver Mega Projects more efficiently and effectively will undoubtedly influence the mindset, skill-set, and organizational culture of other teams within WisDOT that are delivering more traditional projects and programs. Best practices ensures that, first and foremost, new Mega Projects have a solid foundation of information to start from in order to reduce the learning curve and its associated costs, and secondly that the entire staff of WisDOT can benefit and enhance their individual skills through utilizing information on methods offering the best value for project and program delivery. This guide can lead to organizational-wide opportunities to improve decision-making capabilities, more efficiently allocate resources, and improve accountability for delivery of complex projects and programs.

These best practices, or those tools and techniques, are not standard operating procedures within WisDOT and have been utilized to effectively deliver both design and construction phases and the unique management and project delivery practices in use on Mega Projects. The guidelines should be treated as the transfer of institutional knowledge from the staff that has operated in the various functional disciplines with Mega Project experience. The specific scope, scale, capital costs, duration, location, and many other factors of each project should ultimately determine the nature of the manner in which the best practices are utilized.

BEST PRACTICES

Best practices are generally accepted, informally standardized techniques, methods or processes that have proven themselves over time to accomplish a given task. In general, best practice is considered the process of developing and following a standard and effective means of performing tasks that can be consistently repeated. Often based upon knowledge that becomes common sense, these practices are commonly used where no formal methodology is in place or the existing methodology does not sufficiently address the issue. The idea is that

with proper processes, checks, and testing, a desired outcome can be delivered more effectively with fewer problems, unforeseen complications, and reduced uncertainty. In addition, a "best" practice can evolve to become better as improvements are discovered. As such, the best practices contained within this document are not rigid in nature and should be treated as management processes, tools, and techniques that can be taken and adapted to the needs of other projects and programs within WisDOT.

GLOBAL MEGA PROJECT BEST PRACTICES

Best practices were compiled by the functional discipline from which they emanated. In total, eight global best practices focused on higher order management processes and techniques were identified by the key participants. Another best practice is in development and will be included into this report at a future date. This additional best practice focuses on use of *DBE Outreach.* The table below summarizes the individual best practices and is representative of the functional disciplines for which best practices were discussed and developed. Each best practice includes a simple synopsis of the best practice. The more detailed discussion and material for each individual best practice can be reviewed in the *Project Best Practices* section of this document and in the document Best Practices from WisDOT Mega and ARRA Projects.

SUMMARY OF BEST PRACTICES

Program Controls

Program Controls best practices offer a methodology for managing budget and cost, schedule, issues, and documents for multiple interrelated projects comprising a single Mega Project. Program Controls is a requirement of FHWA in the Project Management Plan (PMP) and Annual Financial Plan for all Mega Projects. The size and complexity of a Mega Project requires additional measures and efforts of coordination and communication beyond traditional project management. This best practice facilitates communication and dissemination of key information and data for decision making and ultimate management of the scope, schedule, and budget.

Design Primavera Scheduling

The Primavera software package is being utilized on Mega Projects to determine and analyze critical paths that aids in clearly defining, communicating, and managing the schedule and necessary time required to complete the independent tasks related to project delivery.
FHWA requires a PMP and an Annual Financial Plan for all Mega Projects.
Within the guidance for the PMP are provisions for a project schedule. Due to the enhanced capabilities of Primavera software, this tool is best utilized for the scheduling of the complex design work required for Mega Projects in lieu of traditional WisDOT PMP tools.

Enhanced Public Involvement / Outreach

Mega Project public outreach programs are being utilized to ensure availability of timely, accurate, concise, and useful information to all public stakeholders and entities through a wide range of communication techniques. There are numerous state and federal regulations and laws that influence WisDOT's public involvement program and effectively dictate the need for a focused and directed public involvement/outreach effort. To be effective, the techniques must provide appropriate public input for the relevant project phase, be cost effective, and reach the target audience. The combination of targeted, cost effective, and timely information is imperative to ensuring the relative effectiveness of a public outreach program and is the basis of the activities currently being employed on transportation infrastructure Mega Projects in the state of Wisconsin.

Technical Expert Contracts (i.e., National Construction, Contractor, Owner's Representatives)

The use of Technical Expert Contracts best practice is predicated on the scope of services procured in past technical services contracts from the Marquette Interchange, I-94 N-S project, and the US-41 project. There is no policy requirement for this Best Practice; however, it should be noted that these contracts are typically utilized to facilitate best value practices within the agency. Mega Project Management Plans are required by FHWA and these plans often incorporate unique management structures, quality control processes in design and construction, unique review processes for program budgets, design, constructability, and schedules. The scope of services typically includes Unique Special Provision Development, development of a Prequalification Process, Peer Reviews of Design for cost estimates and schedules, Risk Assessments and Risk Management, Constructability Reviews, Construction Program Management Advice, Construction claims management, and introduction of Unique and Accelerated Construction Methods. Each of these specific scope items are about enhancing the performance of management of the project, controlling Mega Project budgets, and ensuring compliance with the planned schedules and milestones of delivery. This is a value-based approach that ensures knowledge transfer and the gaining of unique perspective from contractors that offer subject matter experts in project delivery and infrastructure construction.

Independent and/or Enhanced Constructability and Design Reviews

Independent and/or enhanced constructability and design reviews provide periodic feedback and input for the betterment of the project design. The WisDOT and FHWA policy requirement is to provide those mechanisms or measures that will avoid construction change orders which could cost the state additional time and funds, as well as tie up resources unnecessarily. The independent review workshops or periodic reviews by outside experts not associated with the design of the project are being performed on most of the current Mega Projects at established design milestones to add value and to ensure that the projects are meeting all standards, requirements, and relevant criteria present in the Mega Project scope of work.

Consultant Corridor Management Assistance

The basis of the Consultant Corridor Management Assistance best practice is to supplement

WisDOT in its efforts to effectively communicate and coordinate the activities required for the Mega Projects to be efficiently and effectively delivered at the best value for the allocated capital. Several elements of scope are involved in this effort and are presented in more detail in the discussion of the best practice. The requirement for the use of Consultant Corridor Management Assistance teams is effectively part of the Mega Project PMP required by FHWA. The use of the Corridor Assistance Management teams ensures that the proper technical expertise is applied and that the availability of resources is addressed. The general policy is to ensure that the work can be completed with the available resources and that it is managed by technical experts with sufficient skills and capabilities. The use of Consultant Corridor Management Assistance teams provides this function while not burdening WisDOT with longer term legacy overhead costs for a single Mega Project. The overarching goal of Consultant Corridor Management Assistance is to ensure that there are adequate resources available to effectively be able to move forward in the project delivery process while ensuring that the proper level of technical and management expertise is leveraged. Consultant Corridor Management Assistance contracts can also serve as a mechanism to foster development and growth in the organization through opportunities to educate, further enhance, and refine WisDOT staff member skills.

Owner Controlled Insurance Program (OCIP)

The best practice of an Owner Controlled Insurance Program (OCIP) is a plan in which WisDOT secures all appropriate insurance coverage for all contractors working on the project and controls all aspects of safety for the workers and public. Typical OCIPs include Worker's Compensation, General Liability, Excess Liability, and Builder's Risk insurance coverage. In some instances, OCIPs may include environmental coverage, Railroad Protective Liability, and Professional Errors/Omissions. The purpose of OCIP's is to capitalize on a method for risk pooling of all required insurance coverage and safety controls. OCIPs used in the proper application present an opportunity to introduce economies of scale into the insuring of work and safety provisions of the project's associated stakeholders. The need for the OCIPs is to centralize all insurance and safety management and controls into a single point and a source where this information can be easily accessed when needed. With increasing complexity and multiple individual projects, as is typically the case on Mega Projects, the economies of scale achieved become more pronounced.

Emergency Response Mitigation Contracts

Emergency response mitigation contracts are primarily used for freeway law enforcement, local law enforcement and fire departments. Freeway law enforcement provides dedicated emergency response in the work zone and helps to clear incidents quickly while controlling work zone speeds. Local law enforcement assists with traffic control on local roads for detour routes and local road speed management. Fire departments plan emergency response based on construction closures. All three agencies participate in project traffic meetings, review roadway closures, and crisis communication planning. This provides a means of communication and coordination with the involved agencies that ensures a clear plan of action. The purpose of using emergency responder contracts is to coordinate dedicated emergency resources available in the Mega Project construction zone and along the adjacent arterial roadway system. The

need is to increase system reliability while facilitating quick clearance of a construction zone during an incident. The construction traffic management plan identifies the dedicated emergency response resources that will be utilized in the management of traffic in the construction zone. The identified and participating resources are able to focus on the project area and supply on call services to manage traffic congestion and incidents during construction in a coordinated fashion.

COMMONALITIES OF BEST PRACTICES

The global best practices are those elements that, at the highest level, should be the foundations of project management and delivery. Four common themes were consistently observed across the eight unique functional areas that were evaluated and explored. Those four themes are summarized as follows:

- **Efficient and Effective Use of Resources:** The efficient and effective use of resources is the cornerstone of being able to manage Mega Project budgets, control schedules, and ensure sufficient performance in delivery. In an era of constrained resources, it is becoming increasingly important to maximize the use of all resources and to realize productivity efficiencies and gains. The combination of increased complexity and constrained resources is a challenge that is constantly being evaluated. The logic behind the best practices is to ensure that resources are being used as efficiently and effectively as possible. The streamlining of costs and capabilities in management is imperative to being able to proactively manage large and unique projects and programs. Many of the best practices noted issues associated with a need for flexibility to ensure optimal resource utilization as a result of dynamic changes in contracts and work packages. Realizing that Mega Projects are inherently more complex as a result of the many moving parts and pieces, building in layers of flexibility into the resource plan for delivery is important.
- **Proper Management, Communication, and Dissemination of Key Information:** The management, communication, and dissemination of key information was highlighted in many of the disciplines as a best practice technique that enabled information flow to occur in a more efficient and effective manner. Key to decision-making capabilities is the clear measures for managing, communicating, and distributing information. The technique of centralization of management to a single point of contact provides enhanced clarity of who needs to be engaged for specific situations. The technique of information management and communication with all stakeholders, both internal and external, provides for an environment in which data and information is readily available to facilitate proactive, as opposed to reactive, management. Furthermore, when working on complex Mega Projects it is important to ensure that data is properly tracked, updated, stored, and easily communicated. This best practice is really a general project management best practice, but the uniqueness here is in acknowledging that for each project team there will be unique needs for certain types of information. From this perspective project managers need to be prepared to think of ways to track, update, and maintain data for everyday uses either with WisDOT tools or by creating their own unique tools most efficiently. It is important to remember that data organization and management is a fundamental building block to enabling effective management and delivery.

- **Leveraging Knowledge and Expertise:** The leveraging of knowledge and expertise of both internal and external resources was cited as a means to enhance the management tools and techniques being utilized to deliver Mega Projects. The use of technical experts, key resources, and outside experts provides for independent and objective views on the most efficient means and measures for project delivery. It was noted that the leveraging of knowledge and expertise continues to improve the core skills within WisDOT while enabling the realization of cost savings and schedule control throughout the design and construction of Mega Projects. The introduction of capabilities and techniques from outside the state continues to ensure that WisDOT is progressing forward in refining Mega Project capabilities while capitalizing on the knowledge of industry experts in the most beneficial manner.
- **Facilitation of Continuous Organizational Improvement**: The development, documentation, and transfer of best practices is important to WisDOT in being able to be a flexible and adaptive organization in relation to the manner in which it is delivering large and complex Mega Projects. The use of best practices across the organization as a means of institutional knowledge transfer engages WisDOT in a process of continuous improvement. The move towards continuous improvement by management within WisDOT is helping to not only make the most efficient use of resources in the organization, but also to enhance the skill sets and capabilities of the organization as a whole. Continuous organizational improvement requires the documentation and development of acceptable and standardized methodologies for delivering projects and programs and the evolving nature of best practices is one of the most effective measures to ensure that this occurs. The combination of the prior three mentioned best practice themes of efficient and effective use of resources, proper management, and communication of key information, and leveraging of industry knowledge and expertise promote continuous improvement. As a result, the realization of the prior themes is continuing to facilitate broad-based organizational change and improvement.

RECOMMENDATIONS

This document is intended to provide institutional knowledge transfer from WisDOT staff and Mega Project team members in relation to challenges that are faced and how the project management tools and techniques can be adapted in response. The documented best practices within this report are conceptual in nature such that they can be reviewed and implemented on other projects of similar complexity. It is recognized that the composition of Mega Project Best Practices is representative of the experiences of staff within WisDOT and that other best practices for managing and delivering complex projects may arise or exist elsewhere.

True best practices are constantly evolving, adapting, and changing to meet the current needs of project and program delivery. While there is no single solution that can be consistently implemented in the exact same fashion and yield the exact same results, it is this Best Practices guide that offers a starting point for project structuring, staff development, and for Mega Project delivery within WisDOT. This guide will help WisDOT to continuously improve, adapt to a dynamically changing environment, and utilize methods that offer the best value for planning, managing, designing, and constructing transportation infrastructure projects and programs in the state of Wisconsin.

BEST PRACTICES - INTRODUCTION

INTRODUCTION TO BEST PRACTICES

Best practices are generally accepted, informally-standardized techniques, methods or processes that have proven themselves over time to accomplish given tasks. Often based upon knowledge that becomes common sense, these practices are commonly used where no specific formal methodology is in place or the existing methodology does not sufficiently address the issue. The idea is that with proper processes, checks, and testing, a desired outcome can be delivered more effectively with fewer problems and unforeseen complications. In addition, a "best" practice can evolve to become better as improvements are discovered. Best practice is considered by some as a business buzzword used to describe the process of developing and following a standard way of doing things that multiple organizations can use.[1]

One could think of best practices in the case of Mega Projects as an evolution in the process of management and delivery. Project teams need adaptive and responsive capabilities to execute and deliver their projects in an efficient manner. The natural iterations and modifications of fine-tuning process and management techniques in the case of managing a Mega Project results in a series of solutions that evolve to best fit the case. One could think of this set of higher order functional best practices as a set of solutions being used to maintain quality as an alternative to mandatory legislated standards and can be based on self-assessment or benchmarking.[2] Furthermore, best practice deployment is a feature of accredited management standards such as ISO 9000 and ISO 14001.[3] The lessons learned that evolved into processes, management strategies, and techniques for managing multiple work packages is documented in this report in the form of a set of higher order best practices by needed functions of delivery. It useful to think of best practice management as an adaptive learning process rather than a fixed set of rules or guidelines, therefore this approach to best practice focuses on fostering improvements in quality and promoting continuous learning.[4]

INFLUENCES OF DELIVERY

The way a project or program is delivered largely relates to the structure of the organization and the general scope of work. The scope of work, or series of projects comprising the total Mega Project in this case, tend to dictate the level of staffing required to manage and deliver the workload. Within the staffing requirements there is the immediate need for structure to facilitate communication and coordination that best enables management to effectively guide the overall efforts. In this sense the scope of work performed by the project and the organizational structure needed to deliver the project are the controlling influences of

[1] "Best Practice Definition". BusinessDictionary.com.

[2] Bogan, C.E. and English, M.J., 1994: Benchmarking for best practices: winning through innovative adaptation. McGraw- Hill, New York.

[3] Nash, J. and Ehrenfeld, J., 1997: Codes of environmental management practice: assessing their potential as a tool for change. Annual Review of Energy and the Environment 22, 487-535.

[4] Measham, T.G., Kelly, G.J. and Smith F.P. (2007) Best Management Practice for complex problems: a case study of defining BMP for Dryland Salinity. Geographical Research 45 (3) pp. 262-272.

delivery. As a result, the general projects and structures of other Mega Projects that have been delivered by WisDOT should be taken into consideration when evaluating and implementing Best Practices.

BEST PRACTICE DOCUMENTATION PROCESS

A systematic approach was utilized in order to define the higher order functional best practices of the Mega Project delivery methods. The process focused on eliciting those best practices that are not standard operating procedures and are beyond traditional project and program management processes and procedures. Evaluations were developed using collaboration between key participants (evaluators, users, and stakeholders) to document the WisDOT Mega Project best practices. The process emphasized focus on qualification of those unique features of management and delivery that are being applied to the project beyond the standard practices for delivery within WisDOT and addressed the following categories:

1. Best Practice Scope – A description of the scope of the best practice as currently being used on Mega Projects.
2. Best Practice Policy Requirement – A description of WisDOT and FHWA policy direction and/or guidance which defines the need for the best practice scope.
3. Best Practice Purpose and Need – A description of the purpose and need of the best practice.
4. Best Practice Stakeholders – A description of WisDOT external agency and external non-agency stakeholders that are involved in the implementation of the best practice.
5. Best Practice Organizational Foundation – A description where within WisDOT the ownership of the best practice should reside, as well as any discussion on responsibility for guidance on the future use of the best practice.
6. Best Practice Resourcing – A description of how the best practice is currently resourced (i.e., in-house vs. consultant).
7. Best Practice Benefits – A description of the benefits derived as a result of usage of the best practice.
8. Best Practice Challenges – A discussion of any challenges with ongoing maintenance or implementation of the best practice.
9. Best Practice Risk – A discussion of the risk of not utilizing the best practice for Mega Project management.
10. Best Practice Opportunities– A discussion of the possible opportunities to streamline overall costs while maintaining the value and effectiveness of the best practice.
11. Best Practice Opportunities to Expand – A discussion of the opportunities that exist to expand the best practice into non-Mega Projects and Programs within WisDOT.

The higher order management functions, strategies, and techniques discussed within the best practice discussion included the following key areas (note the context of each evaluation and discussion for each functional area below):

1. Program Controls – The basis of the discussion is to evaluate the appropriate scale of the effort on Mega Projects in relation to the total scope and to consider ideas on how to provide the desired functions at a streamlined cost.
2. Design Primavera Scheduling – The basis of the discussion is to evaluate the use of Primavera as a scheduling tool in comparison to the use of the more traditional PMP tool(s).
3. Enhanced Public Involvement/Outreach – The basis of the discussion is to evaluate the appropriate scale of the effort on Mega Projects in relation to the total scope and to consider ideas on how to provide the desired functions at a streamlined cost.
4. Technical Expert Contracts (i.e., National Construction, Contractor, Owner's Representative) – The basis of discussion provides an evaluation of the value of the use of technical expert contracts and includes considerations for scaling usage on Mega Projects in relation to the total scope.
5. Independent and/or Enhanced Constructability and Design Reviews – The basis of discussion explores the general purpose of the best practice and the corresponding value received from deployment of the best practice.
6. Consultant Corridor Management Assistance – The basis of discussion explores the general purpose of the best practice and the corresponding value received from deployment of the best practice.
7. Owner Controlled Insurance Program (OCIP) – The basis of the discussion is to evaluate the use and applicability of leveraging an Owner Controlled Insurance Program on Mega Projects.
8. Emergency Response Mitigation Contracts – The basis of the discussion is to identify the need and roles and responsibilities of Bureau and Mega Project Teams in the usage of Emergency Response Mitigation Contracts.

The basis of discussion and structure of the documented effort is intended to provide detail relating to how the best practices are utilized and applied within the management and delivery of a Mega Project, as well as how each individual best practice is relevant. Mega Project best practices formulate the basis of an evolving and developing document that can be refined as more Mega Projects in the state are delivered and best practices are further formalized and documented. These guidelines will transfer institutional knowledge, lower the learning curve, reduce management efforts for structuring of project teams, as well as offering cost and time efficiencies for future projects.

1. PROGRAM CONTROLS

1. Program Controls

BEST PRACTICE TITLE: Program Controls for Mega Projects

Basis of Discussion: Evaluate the scope to scalability ratio of the effort on Mega Projects

Best Practice Scope:

Mega Project Program Controls consists of proactive project management and begins managing the Mega Project corridor program in early design. The effort continues through construction, including finals and project closeout. Program Controls performs functions in the following four categories:

- Budget & Cost Management
  - Establish project budgets
  - Track and update estimate updates and project spending
  - Balance and report on project budgets and all financial data
  - Project programming, including project ID structure, FIIPs updating
  - Manage program to committed program levels and coordination of program with OPBF and BSHP
  - Create and manage change management process
- Schedule Management
  - Create detailed project schedules
  - Track and update schedules with updates from coordination meetings and project team members
  - Analyze and report on project schedules, including critical path
- Issue Management
  - Document issues identified by project team members and/or in issue meetings
  - Track and update issues reporting and ball-in-court issues responsibilities
- Project & Document Management
  - Create document management protocol and organization plan
  - Process and management documents and requests
  - Record and distribute meeting minutes

Program controls performs tasks that may exist in all WisDOT projects, but at a level of greater attention and detail, as well as additional tasks that become necessary either by requirement or simply by the size and complexity of Mega Projects. Program Controls provides tools and information to enable project management to make informed decisions. The deliverables of the Program Controls function are often key components and data sources of other best practices used by Mega Projects.

Program Controls teams provide WisDOT management with project information that is current, easily accessible, and displayed in a consistent manner across all projects and function areas to assist with making good decisions on management of project scope, schedule, and cost. It facilitates improved forecasting capabilities, proactive problem resolution, and improved communication, and integrates schedule management, contract management, cost

management, earned value management, and electronic content management to better support management and delivery of mega projects.

Best Practice Policy Requirement:

FHWA requires a PMP and an Annual Financial Plan for all mega projects (defined as estimated cost of greater than $500 million). Within the guidance for the Project Management Plan are provisions for a Project Controls team that provides the functions listed above. As stated in the guidance:

A project controls functional team will normally help manage the scope, total cost and overall master schedule for the project, in order for the entire project delivery team to meet the stated objectives of the project being completed on time and within budget. The project controls functional team will also produce project reports, including quantifying schedule delays and cost increases, and initiatives being analyzed to recover.

The Program Controls best practice meets this requirement, and helps generate, maintain, and update the required Project Management Plan and the Annual Financial Plan. The following is the definition for program controls (referred to as project management controls) by FHWA:

FHWA refers to PROJECT MANAGEMENT CONTROLS (Contract Administration, Scope, Cost, Schedule, Risks and Quality) A project controls functional team will normally help manage the scope, total cost and overall master schedule for the project, in order for the entire project delivery team to meet the stated objectives of the project being completed on time and within budget. The project controls functional team will also produce project reports, including quantifying schedule delays and cost increases, and initiatives being analyzed to recover. This section includes project management controls that should be used on most major projects.

A. Risk Management Plan

B. Scope Management Plan

C. Scheduling Software

D. Cost Tracking Software

Best Practice Purpose and Need:

The purpose of Mega Project Program Controls is to provide managers making program/project decisions with the valuable accurate and current data and information required for making effective management decisions regarding the direction of the program. The programs for Mega Projects can involve hundreds of project IDs involving specific design, real estate, utilities, traffic mitigation, public information, and construction that add up to hundreds of millions of dollars. In addition, the programs span several years yet must come in within a specified budget and timeline accounting for inflation and cost escalation, risks and issues, identified and not yet identified at the beginning. FHWA, WisDOT's partner in financing the Mega Project, requires strict oversight over budget as well as the ensuring of public confidence. Program Controls provides everything in one place, one dashboard; something not provided by any other WisDOT system in place.

The purpose for the Program Controls best practice is to provide dedicated resources, defined processes, and appropriate tools to deal with the size, duration, and complexity of mega projects. By performing the roles and tasks in the four categories specified above, Program Controls can help project management meet the goals of delivering the project on time and on budget. The best practice also fulfills the recommendation in the FHWA guidance referenced above.

In addition to the need of being part of the FHWA guidance, the program controls functions address the needs created by the size, complexity, and duration of a mega project. Budget and cost management meets the needs of helping management keep the project on budget despite being of significant cost and scale (ex: over $1.5 billion dollars in project costs across several years). Program Controls can provide reports that answer questions on the project costs. The detailed budget also enables management to actively manage the Mega Project programming and adjust the program to best leverage available funding. The project schedule is necessary because of how many projects, how many years, and the dependencies and critical path of the overall project. By being able to coordinate and manage complex information on multiple individual projects across a total program, project managers are better able to help deliver the Mega Project on time and within budget. Tracking and managing the issues by Program Controls addresses the need to maintain accountability and timely resolution for issues. Providing document controls addresses the need to have the very large volumes of documentation organized so that information can be found when needed.

Best Practice Stakeholders:

There are several stakeholders, both internal and external, for agency and non-agency roles that are affected by Program Controls. The data produced and information reporting capabilities are far reaching. The stakeholders affected or influenced by the best practice of Program Controls include:

1. WisDOT
    a. Mega Project Supervisors and Management
    b. Mega Project team members
    c. WisDOT supporting region team members
    d. WisDOT supporting bureau team members
    e. WisDOT senior management
2. External
    a. Consultant team members
    b. FHWA
    c. Municipalities within the Mega Project
    d. State of Wisconsin
    e. Taxpayers

3. Stakeholders that are involved in the implementation of the best practice
    a. All Mega Project team members, WisDOT, and consultant
    b. WisDOT supporting region and bureau team members
4. Program Controls stakeholders
    a. Mega Project Finance/Program Controls Team—both WisDOT and consultant
    b. The Mega Project Section(s)
    c. Region management
    d. Region ad hocs
    e. Division management
    f. The Bureau of State Highway Programs
    g. The Office of Policy, Budget, and Finance
    h. The Bureau of Project Development
    i. FHWA

Best Practice Organizational Foundation:

Ownership of the Program Controls best practice resides with Mega Project management. Each Mega Project implements the Program Controls best practice, following the FHWA guidance as well as previous WisDOT Mega Project examples.

Best Practice Resourcing:

The resourcing of Project Program Controls is done both using internal WisDOT staff and external consultant resources. There are several examples from Mega Projects including functional organization charts and position descriptions in the following documents that will provide assistance to illustrate the roles and responsibilities for Project and Program Controls.

Organization Charts/Position Descriptions – Mega Staffing Template, Zoo Interchange PMP, I94 North-South PMP

Best Practice Benefits:

There are many benefits to engaging in the best practice of project management through Program Controls. First, the best practice satisfies the guidance of the FHWA for the items within program controls scope. Secondly, Program Controls allows for assigning tasks to specialized team members. Due to the Mega Project size, complexity, and duration, these tasks would otherwise be too overwhelming to be done by the traditional PDS project staffing model,

as well as be a potential inefficient use of resources. There are also benefits associated with each of the four core controls functions:

- Budget & Cost Management
    - Allows for managing individual projects and the Mega Project cost total to a set budget
    - Improves tracking and control of project spending and costs
    - Allows for the managing of the budget to a program or appropriation allocation level
- Schedule Management
    - Improves coordination of tasks along the critical path to reduce project delays and event risks that may otherwise induce delays
    - Improves resource allocation for project and supporting teams by providing schedules that can forecast workloads
    - Improves communication between units and team members through the use of the detailed schedule
- Issue Management
    - Improves accountability and tracking of resolution of issues
    - Reduces risk of costs or delays having impact due to issues that the uncertainties that projects may encounter
- Project & Document Management
    - Improves organization and retrieval of project documentation, which in turn improves decision making and consistency on the project
    - Provides the means for better implementation of lessons learned during the project because of improved record keeping

The biggest benefit of Mega Project Program Controls is that it offers a one-stop, all-encompassing tool that provides a complete and unified planning, budget, schedule, and records management structure to ensure accurate tracking of issues and risks, costs and schedule, documents/records, and public information. It effectively serves as a dashboard in which information pertaining to the Mega Project direction, historical information, status, and future trajectory can easily be obtained. The use of Program Controls is a forecasting tool that can incorporate capabilities to identify possible risks and changes across all project coordination functions.

No other system currently used by WisDOT encompasses all the major points for managing the many complex facets of a total program. Program Controls functions ensure timely responses to FHWA and other requests and audits. It guarantees complete and indexed records management for quick and effective open records requests as well as storage and retrieval. It brings the information/data from a multitude of WisDOT systems into a single and centralized place.

Best Practice Challenges:

The success of the Program Controls best practice depends on all project team members understanding how Program Controls impacts them and how they can best leverage the

information generated as they perform their jobs. This requires some training to help project team members understand in interfacing with Program Controls staff, as well as understanding how Program Controls can help make their jobs easier, more efficient, and productive. This is further by having buy-in and support throughout the management structure from the top down.

One of the challenges faced is making sure this is done early in the project, and reinforced throughout the project, so that Program Controls effectiveness does not slip. There are some detail level challenges that are faced with a best practice with a scope and staff as large as Program Controls, from details such as best software tools and processes to implement, to decisions on size and make-up of controls team staff.

The greatest challenge is in finding the appropriate size and acceptable cost level for an effective and efficient Program Controls effort, as well as the best make-up of staff for the effort (consultant or WisDOT). Considerations of how costly the desired technical staff with the appropriate skill level and support tools required should be made.

Best Practice Risk:

There are many risks in not engaging in the Mega Project Program Controls best practice. First, there is the risk of FHWA not being satisfied with how their guidance for Mega Project management is being followed. Second, there are the risks associated with the costs that will result from the benefits, efficiencies, and cost savings described earlier. As size, scope, complexity, and duration increase, the way projects are managed needs to adapt rather than just scaling up in accordance with traditional practices, and Program Controls is one of these changes that can reduce risks and costs. Without some level of the tasks within the Program Controls best practice scope, it is highly unlikely that traditional methods of project management would deliver a Mega Project on time and on budget as a result of less effective information for decision making and less efficient communication. As a result of potential inefficiencies and lack of data for decision making, it is also very likely it would result in delivery of Mega Projects at an increased cost.

The lack of information and control over the project is also a major threat to overall Mega Project delivery success. There is the risk of losing control of or never truly having control of the relatively large, intricate, and integrated budgets and schedules of the largest public works projects ever undertaken by Wisconsin. There are multiple examples of Mega Projects that have lost control in terms of total budget management due to lack of information and accurate tracking of data.

The impacts can be detrimental with costs far exceeding the original estimates. It should also be noted that FHWA asks for Program Management Plans for projects over $500 million. Program Controls (Program Management) is one of the pillars of those plans. The public has entrusted WisDOT with billions of dollars for highway infrastructure construction. The potential cost cutting savings measures of eliminating the cost of Program Controls is far outweighed by the benefits of receiving timely, prudent, and effective delivery of large-scale Mega Projects on

time and on budget. It should be noted that experience provides value to sound Program Management practices.

Best Practice Opportunities:

There are several approaches that could be examined for improving the cost effectiveness of the Program Controls best practice. The first step is in taking the lessons learned and the project experience and expertise created and leveraging this knowledge gained to deliver future projects. With effective knowledge transfer this may potentially enable the tasks to be accomplished with fewer staff members. A more challenging approach would be to examine all of the tasks and qualifications of staff, as well as looking at consultant versus in-house staff, and better matching skills and costs to the tasks that need to be done. This has potential to further reduce costs and create skill-adapted efficiencies. The most extreme level of this, with the greatest potential for savings, would be a staffing model that allows for hiring in-house staff whose employment is only for the duration of the project. The most challenging approach to increase cost effectiveness in delivery can result in the potential to actually increase Program Controls costs, but may transfer even greater savings to the project overall by looking at even more tasks done by more relatively expensive WisDOT and consultant staff. This may offer the option to look for more ways to consolidate tasks into a specialized Program Controls team where broader departmental savings can be achieved and with broad-based reduction of project uncertainties and risks.

With the multitude of lessons learned and evolution and improvements in software, the labor costs for managing the Mega Project programs should be going down considerably. With the improved reporting capabilities now built into Primavera by WisDOT Mega Project teams and the use of better, more efficient data mining through the use of Business Objects, the cost for Program Controls in the future as a percentage of the program will be less than it has been as a considerable portion of the base investment in development of the knowledge and skills of effective deployment of Program Controls has already been realized. Another cost reduction would be in consolidating multiple, similar task positions into fewer; for example, having project level document control done more at the program level, reducing the number of employees needed for document control and centralizing the function of document management. Other examples include possible administration cost cuts by reducing consultant administrator time charged against the Mega Project from full-time to part-time while filling currently vacant DOT positions to replace more costly consultant staff. The combination of many of the suggestions for the realization of potential efficiencies offers the option to reduce overall costs of the Program Controls best practice.

Best Practice Opportunities to Expand:

The success of the American Recovery and Reinvestment Act (ARRA) program in managing individual projects to a set budget serves as an example of how financial best practices from Mega Projects can expand. Such an expansion must be very carefully researched and implemented, for not all components of the Program Controls best practice will realize benefits from being expanded. By their individual definitions, many of the components of the best practice are tasks currently being done in some fashion, but need to be expanded or

consolidated because of the increased size, complexity, and duration of a Mega Project. Without the increased size to accommodate scale of the Mega Project, many of the components simply would not be needed, and current practices may be the most efficient; however, as the budget example shows from ARRA, there are opportunities to expand some of the concepts. Exploring current project outcomes and measures provides an opportunity to look for the greatest opportunities where there is a need to improve. This allows for consideration of where the greatest costs are, those steps that could be examined with the goal of exploring whether a Program Controls best practice feature would be helpful, and whether it could be scaled to fit without being too costly to implement.

While the entire improvement program could benefit from expanding this best practice, budget and resource constraints likely make this impractical. Of the four major functions covered within the best practice (Budget/Cost Control, Schedule Control, Issue Management, and Document Control) it is believed that the function with the most benefit from being expanded to cover the entire improvement program is the Budget/Cost Control Function.

Organizationally WisDOT has some experience with this concept, having utilized it in managing delivery of the ARRA program projects. Similarly, this best practice could be expanded to the entire improvement program by requiring each project to submit a monthly project financial report to track project expenditures. Items that could be reported and tracked include:

1. Actual expenditures vs. budget
2. Percent of current budget expended
3. Anticipated cost-to-complete
4. Value of pending Contract Modifications (construction)
5. Reserve balances

It is important to consider that on a statewide basis such a reporting mechanism would create a very considerable amount of data that could be difficult for decision makers to draw any relevant conclusions from. A further refinement would need to be incorporated to construct a Design/Construction Project Management Dashboard report which would provide decision makers with an “at-a-glance” view on the status of projects that are performing outside of pre-established performance levels or boundaries, as well as the status of the overall program. Individual project performance level metrics might include:

1. Cost-to-complete estimates exceeding base budgets by 10%
2. Project reserve budgets falling below 5%

The report would only list projects falling outside of the established performance levels. In addition, it would provide a rollup of the total cost-to-complete estimates for all projects in the program as compared to the total budget amount. The report would provide managers with critical information on projects potentially in trouble, thereby giving the ability to provide assistance or take corrective actions and allow program adjustments to the statewide program throughout the delivery process in a more dynamic and adapted fashion.

2. PRIMAVERA SCHEDULING TOOL

2. Primavera Scheduling

Best Practice Scope:

Primavera Scheduling software is currently being used by all aspects on the Mega Projects. The goal of the Primavera software package is to determine critical paths that will aid in clearly defining the schedule and the necessary time required to complete the independent tasks related to project delivery. For this reason, Primavera software is best utilized for scheduling of the complex design work required for Mega Projects.

The software identifies the key milestones and critical tasks in the project schedule and helps to integrate them into the master schedule to ensure that all delivery dates are met for each project. The dates and tasks typically integrated include items for real estate, structure, railroad, ITS, lighting, landscaping, and the general delivery of project tasks from 30% to Let dates. The PMP schedule is comprised of a minimum of 13 tasks for any project and up to 35 tasks based on scope specifics. Not all tasks are required in the schedule, as some tasks are informational only and/or are only representative of project attributes or conditions.

Typically, the designated scheduler begins the process by meeting with Project Managers using a template and builds in the details such as the individual tasks, task durations, and task dependencies. The scheduler must tailor the schedule with specific information of interest to the Project Managers. Each task is linked in a manner that creates a pathway that defines the ultimate critical path. The scheduler can then use the analysis of “what if” scenarios in terms of managing the projects and tasks and ensuring that milestone dates align and can be met. To be effective, the scheduler must maintain and provide to all stakeholders a master schedule. The scheduler is required to meet with Project Managers in regular intervals (weekly) to communicate updates, revisions, and/or completion of tasks within the schedule. The master schedule can then be continually updated and refined as the project evolves and proceeds toward completion.

In comparison, the WisDOT PMP application also allows for scheduling of design project key milestones and critical tasks. The PMP application schedule is derived from project scope items identified as contributing to the project. The scope module includes all tasks listed in the Facilities Design Manual (FDM). While both Primavera and the PMP web application include key milestones, the PMP application schedule is not critical path based. Primavera meets the FHWA requirements of a master program schedule with critical path criteria. Currently, WisDOT does not have Primavera scheduling expertise to apply to projects. The Primavera scheduling software learning curve is steep. There are many benefits of using Primavera. Mega Projects are more complex and therefore require multiple projects being coordinated to meet the needs of each individual project team, FHWA expectations, and Division program goals. The software supports reporting functions to be customized by discipline to ensure the relevant information is communicated in a consistent fashion.

Primavera allows for designers/managers to focus on important tasks rather than spending many hours on schedule functions. In comparison, the PMP application also allows for scheduling of design project key milestones and critical tasks. The PMP application schedule is

derived from project scope items identified as contributing to the project. The scope module includes all tasks listed in the FDM.

Best Practice Policy Requirement:

FHWA requires a Project Management Plan and an Annual Financial Plan for all Mega Projects. Within the guidance for the Project Management Plan are provisions for a project schedule. FHWA has strongly advised that a master program schedule be integrated (i.e., the individual contract milestones tied to each other) such that any delays occurring in one activity will be reflected throughout the entire program schedule, with a realistic completion date being reported.

It has been determined that Primavera scheduling tool meets the above FHWA objective as well as the following schedule management objectives:

- Create detailed project schedules
- Track and update schedules with updates from coordination meetings and project team members
- Analyze and report on project schedules, including critical path

These objectives meet the stated requirements to generate, maintain, and update the required PMP and the Annual Financial Plan. It is important to note that WisDOT does not have a policy dictating the type of scheduling software for Mega Projects; however, FHWA guidance from the 2009 FHWA Project Management Plan Guidance on scheduling software is as follows:

> *The Project Management Plan should include the scheduling software to be used for the project. Consideration should be given to requiring the same software package for all schedules to be generated by the project controls functional team, the design consultants, and the contractors, in order to ensure uniformity and compatibility for the overall master schedule. The frequency and the detailed process of reviewing and validating schedules should be also included.*

Best Practice Purpose and Need:

The purpose of Primavera Scheduling tool is to manage a multitude of inter-related projects to meet Mega Project program delivery expectations of the FHWA, the Division, and the public. The need of Primavera Scheduling tool is that the task of scheduling must use the critical path for managing the complex relationship of multiple project tasks. Additionally, Primavera Scheduling tool can work cooperatively with the Primavera Contract Manager, connecting schedule and financial information such as cost loading. MS Project also uses critical path for scheduling, but the concern with MS Project is whether it is robust enough to handle the larger volume of tasks and relationships that epitomize WisDOT Mega Projects. Additionally, MS Project is not capable of cost loading tasks. The WisDOT PMP application does not use critical path methodology for scheduling.

Best Practice Stakeholders:

The following table describes the key Best Practice stakeholders, their roles, required outputs, and expectations, as well as a measure of their influence and classification as it pertains to the project:

Position	Role	Requirements	Expectations	Influence	Participant
Division Administrator	Accountable for improvement program delivery	Program Commitments achieved	Programs delivered on time, within budget and at agreed standard of quality	High	Internal
SWB Operations Director	Consulted for improvement program delivery	Deliver programs within Division policies and guidelines for project management	Programs delivered on time, within budget and at agreed standard of quality	High	Internal
Region Operations Director	Consulted for improvement program delivery	Deliver programs within Division policies and guidelines for project management	Programs delivered on time, within budget and at agreed standard of quality	High	Internal
SWB Directors, managers and supervisors	Consulted for improvement program delivery	Deliver programs within Division policies and guidelines for project management	Programs delivered on time, within budget and at agreed standard of quality	High	Internal
Bureau of Structures	Accountable for structure plan delivery (consultants can have responsibility for delivering structure plans for review)	Project management best practices are applied for efficient project delivery	Projects delivered according to project management plan	High	Internal
Project Management Unit	Consulted for project management policy, procedures, and best practices	Project management best practices are applied for efficient project delivery	Projects delivered according to project management plan	High	Internal
Region Director, managers and supervisors	Consulted for improvement program delivery	Deliver programs as scheduled and budgeted with expected standard of quality	Programs delivered on time, within budget and at agreed standard of quality	High	Internal
Project Manager	Accountable for project delivery	Deliver project scope, schedule, and budget within agreed project management plan	Projects delivered on time, within budget and at agreed standard of quality	High	Internal
Project team members	Responsible for project delivery	Deliver project scope, schedule, and budget within agreed project management plan	Projects delivered on time, within budget and at agreed standard of quality	Medium	Internal
Program Controls	Consulted for project delivery issues, risks and quality	Projects controlled to meet delivery commitments	Projects tracked for on-time, within budget, and at agreed standard of quality	Medium	Internal
FHWA	Informed of program – approval required on Federal Oversight projects	Federal Oversight projects identified and managed to meet requirements	Federal Oversight projects delivered meet requirements	High	External

| Position | Role | Requirements | Expectations | Influence | Participant |

DNR and Army Core of Engineers	Consulted	Environment protection incorporated in improvement project plans	Environmental concerns addressed and appropriate action taken and documented	High	External
Public	Consulted and Informed	The right projects are selected and completed timely and efficiently – lowest cost for expected quality	Projects solve transportation safety and/or efficiency problems	Medium	External

Best Practice Organizational Foundation:

The Division's Project Management office should be the entity responsible for maintaining and supporting the scheduling tool. As owner, this office would be responsible for establishing future guidance with regard to project management policies, procedures, best practices, and ongoing tool support.

Best Practice Resourcing:

WisDOT currently does not have Primavera Scheduling expertise to apply to the projects. This function is currently being provided by outside consultants for utilization in the Mega Projects. The Project Management Unit currently procures a license and management services for the Mega Project team scheduler. The Project Management Unit, along with the BITS, coordinates software upgrades.

Best Practice Benefits:

Primavera Scheduling Tool Benefits:

- All activities are logic tied and due dates are maintained in one source to ensure that everyone is working towards the same goal.
- Centralized control of information and dissemination to a key single point of contact.
- Can be done very early in project development to provide analysis/"what if" scenarios to begin framework for project due date requirements.
- A variety of consistent and custom reports of interest by various design teams and functions can be created from the database.
- The schedule is updated almost daily with current status to maintain alignment and consistency in reporting.
- Logic tied schedule provides critical due dates for various tasks within the project.
- The schedule is created and managed based on advance-able schedules for program flexibility.
- The scheduler tool is interactive and provides analysis and feedback of pertinent items and due dates.
- Creates a structure for accountability and responsibility.
- Creates a true "team" culture.
- Internal and external milestone dates can be achieved, and budgets can be better controlled.

- The reporting functions can be customized by discipline to ensure that relevant information is communicated in a consistent fashion.
- Provides level of confidence for managers in reporting consistency and delivery of the projects/program.
- Meetings can be streamlined.
- Helps to define/align budget requirements for delivery.
- The scheduler tool allows for faster development of custom reports vs. WisDOT in-house software.
- Allows for designers to focus on important tasks rather than spending many hours on schedule functions.

WisDOT PMP Application in Comparison:

- Tasks scheduled and completion dates are maintained in one source available to all project team members as well as all WisDOT staff.
- PMP schedules can be built very early in the program level scoping phase. Schedules can be manipulated to recalculate proposed schedule for "what-if' scenarios.
- Schedule reports are available through the application and through report writers. Various reports include schedule information related to the business area based on the report owner's business need.
- All schedule information can be updated by the project manager, project leader, and their delegates. Business area schedule tasks can be updated by the project business area representative and delegates.
- Tasks due dates are readily available for reviewing, updating, and reporting.
- Project schedules can and should be set to meet earliest possible PS&E dates.
- PMP schedules require engineering and business area experts review for accuracy, completeness, and credibility.
- Project team members are responsible for the delivery of their scheduled tasks.
- PMP is built for teamwork and promotes a teamwork environment.
- The budget module allows for delivery budget development and management. The delivery estimate calculator provides feedback to the project team on estimate delivery rate.
- Meetings can be efficient and effective.
- "Primavera Scheduler tool allows for faster development of custom reports vs. WisDOT in-house software"?
- Crystal Reports creates reports using PMP information. Reports are customizable and some are parameter driven (reports for business areas and programs).
- PMP schedule is quick and easy to use. Project team members must be held responsible for timely and accurate data.
- PMP application integrates scope, budget, schedule, team and contact information, and project phase development. Project-specific information from other systems is displayed in the PMP – Railroad Crossing Inventory System, Highway Structure Inventory System, and Transportation Utility Management System. No duplication of information when source of information is connected to the PMP application.

Best Practice Challenges:

There may be initial skepticism or resistance due to lack of familiarity with Primavera Schedules. WisDOT does not have in-house expertise in Primavera scheduling and thus requires outside consultants to provide the necessary expertise for WisDOT. As the current version of Primavera employed by WisDOT is not web-based, the WisDOT staff is not able to retrieve, view, and use the schedules as they currently are with PMP. For example, BOS needs to utilize the Primavera schedule to have sufficient resources available to structure plan submittals and review; however, since Primavera is not web-based, the schedule must be placed at a location they can access or sent to them periodically. Training may be necessary for certain WisDOT employees to learn how to read and utilize the Primavera scheduling tool.

Having multiple scheduling platforms is an additional concern when the primary service provided by the product is scheduling. Currently, PMP integrates scoping, budgeting, scheduling, and team and agency contact information. Migrating Primavera (Planner/Scheduler) client user to Primavera's web-based scheduling tool has a cost per license. Each user (reader or writer) requires a license for the web-based version. A web-based Primavera scheduling tool would allow for easier support and administration. However, integration with other systems of record could still present a problem. Integration could be achieved through reporting. The user would not have one-stop location for all project information within one system, rather the user would have to rely on reports to pull all the relevant information together for review. Changes would have to be made in the system of record.

Best Practice Risk:

The risk of not utilizing Primavera or another off-the-shelf critical path method scheduling software is in not meeting FHWA expectations for schedule definition, management, and reporting, and project team members not having critical path and comprehensive schedule tasks identified for proactive schedule management.

Primavera Scheduling software provides a critical path for many design milestones which can be tied together with logic to create a schedule. The current WisDOT PMP scheduling tool does not utilize critical path logic and does not allow multiple milestones to be implemented into the schedule. If Primavera is not utilized, PMP will need to be utilized, which could create issues with meeting Let date deliverables. This can create issues because it can be difficult for a project manager to manage many projects with multiple dynamic milestones within an accelerated schedule throughout all the entities of the design. Primavera scheduling software is recommended and better suited for Mega Project program scheduling.

Best Practice Opportunities:

There are several ways in which to capitalize on the use of Primavera Scheduling software:

- Opportunity to develop WisDOT expertise staff as cost-saving measure
- Scheduling knowledge is important for successful project management
- WisDOT expertise staff with consultant staff available during program peaks; WisDOT expert staff may be more inexpensive than consultant expert staff

The following is an excerpt from the 2007 Project Management Tool Review Team Final Report:

> The 2007 PMP Tools Review Team recognized the benefits and demands of utilizing the Primavera software. The team recommends the Project Guidance Matrix be used when determining which project management tools should be employed and which projects may meet the criteria for using Primavera software.
>
> Primavera Scheduling software is recommended for projects with high risk, accelerated schedules, and many critical path milestones or tasks. Some large non-Mega Projects may fit into these criteria. Large or long corridor projects with extensive real estate acquisition would also be suggested to manage many properties at different stages of real estate acquisition being completed by different entities (consultant, central office, and region). A dollar value threshold is not a good determination of criteria for whether Primavera or PMP should be utilized, as the project could be very simple in nature with not a lot of deliverables yet causing a large dollar value; whereas a smaller compact project with many obstacles could be a very good candidate for Primavera due to deliverables being dependent of each other to keep the project on schedule.

Primavera Scheduling software could be utilized for other programs within DTSD. An example of use could be utilizing it to schedule and organize research projects and inspection throughout the state. Each research project may have similar tasks all happening at different times. This would help organize staff and crews for inspection and other tasks needed to complete the project. Another program which could utilize Primavera could be the proving periods of plantings, signs, and pavement markings on a statewide basis. Aerial flights for photography and survey data request could utilize Primavera to determine appropriate schedules and deliverables needed to meet survey and photography requests from a statewide perspective. The WisDOT proposals section and Bureau of Structures could utilize Primavera to maintain a statewide program schedule for plan reviews to ensure the proper amount of staff are available for reviews to let projects.

3. ENHANCED PUBLIC INVOLVEMENT/OUTREACH

3. Enhanced Public Involvement/Outreach

Best Practice Scope:

The goal of the Mega Project public outreach program is to ensure availability of timely, accurate, concise, and useful information to all public stakeholders and entities through a wide range of communication techniques. To be effective, a technique must provide appropriate public input for the relevant project phase, be cost effective, and reach the target audience. The combination of effective, targeted, and timely information is imperative to ensuring the relative effectiveness of a public outreach program and is the basis of the activities currently being employed on transportation infrastructure Mega Projects in the state of Wisconsin.

There are really two distinct phases of public involvement necessary during infrastructure development projects. During the environmental and design phases of a large-scale infrastructure project, the particular focus is listening to public feedback, understanding concerns, and incorporating stakeholder input. The preliminary focus is to try to ensure the public that their concerns and needs are being met in an effective fashion with the public money allocated to deliver the project. As the project progresses through preliminary and into final engineering and construction phases, the emphasis shifts to sharing information and responding to questions and concerns of the public related to construction. This provides direct communication with the public of how they will be impacted and for how long. In other words, it communicates the temporary pain endured for the long-term benefits received in exchange.

The best practices are based on lessons learned. The team performing the evaluation focused on the public involvement techniques that are traditionally employed during the construction phase of a project; however, it should be noted that much of the public outreach, public interface meetings, and methods of consensus building are all activities that are traditionally what would be employed during the design phases.

The following table presents the scope of items discussed at the team level for enhanced public involvement/outreach that can be applied at various phases of project delivery:

Media	Technology	Print Pieces	Outreach	Visual/graphics	Meetings	Other
–Paid media: Radio, print ads, TV, digital banner, non-traditional –Free media: Blogs, building relationships, news releases	Project web sites Social media E-blasts QR codes Emerging technology	– Newsletters – Brochures – Get around guides – Project briefs – Media inserts – Postcards – Database development for print pieces	– Neighborhood meetings – Outreach specialists – School/education outreach programs – Hotline (including 24/7 access) – Festivals – ethnic, WI State Fair, faith-based – Door to door/literature drops – Business toolkits – Translated pieces into various languages – Multicultural outreach – Meeting calendar	– Physical models – Drive through animations – Renderings	– Project Information – Meetings – Hearings – Advisory committee meetings (Technical, Citizen, CSS) – Elected official briefings	– Public Involvement plans – Project Branding – Market research

Best Practice Policy Requirement:

There are numerous state and federal regulations and laws that influence WisDOT's public involvement program and effectively dictate the need for a focused and directed Public Involvement/Outreach effort. Each of these elements influences the type and manner in which information is disseminated to the public. The overarching theme of each of the regulations and laws is to ensure that the public is adequately informed of the planned improvements. The goal is to ultimately gain buy-in from the public in terms of reassuring them that their public dollars being expended are being utilized effectively while informing them of the benefits they will receive in exchange. The second piece is to ensure that the public stakeholders understand the temporary disruptions that must be endured in order to obtain the planned benefits and public improvements. The following lists summarize the various state and federal laws and regulations:

State Laws:

- Wisconsin Statutes, Title I, Chapter 1.11, regarding environmental policy.
- Wisconsin Statutes, Title XI, Chapter 84, governing the State Trunk Highway System.
- Wisconsin Statutes, Title VIII, Chapter 66, regarding urban and regional planning and coordination.

Federal Laws/Regulations:

- Federal-Aid Policy Guide, Part 771, Environmental Impact and Related Procedures.
- Federal-Aid Policy Guide, Part 712, R/W Acquisition.
- 40 CFR 1500 – 1508 - This regulation requires that all agencies make diligent efforts to involve the public in preparing and implementing their NEPA procedures.
- The Federal-Aid Highway Act of 1962, Section 134, requires a 3-C planning process (Comprehensive, Continuing, and Cooperative) in all urban areas (23 USC 134).
    - The Federal-Aid Highway Act of 1970 is most significant for public involvement in highway planning and design.
- Each state must have procedures, approved by the FHWA, to carry out a public involvement/public hearing program pursuant to Section 23 USC 128. WisDOT procedures are in this chapter.
- Section 4(f) of the Department of Transportation Act of 1966 requires considerations relating to publicly owned parks, recreation, wildlife, or historic areas.
- The National Environmental Policy Act of 1969, Section 102, requires the preparation of environmental impact statements on all major federally aided projects with significant impacts (42 USC 4321, et seq.).
- The Demonstration Cities and Metropolitan Development Act of 1966, Title II, requires area wide reviews of federally aided capital projects in metropolitan areas.
- The Intergovernmental Cooperation Act of 1968.
- Executive Order 12898, Federal Actions to Address Justice in Minority Populations and Low-Income Populations, February 11, 1994.
- The Transportation Equity Act for the 21st Century (TEA-21).

- TEA-21's requirements for public participation are not necessarily project specific. In general, TEA requires that state and metropolitan planning organizations involve the various public stakeholders and entities early and throughout their long-range system planning, programming and transportation decision-making processes.

Best Practice Purpose and Need:

There are several elements defining the purpose and need of the Public Involvement and Outreach efforts deployed on transportation infrastructure Mega Projects in the state of Wisconsin. The most prominent purpose and need is to comply with state and federal regulations in keeping the public stakeholders properly informed and allowing for their input into the development process. The purpose is also to ensure the availability and dissemination of timely, accurate, and understandable information to WisDOT's customers (i.e., public users of the infrastructure) during all phases of a project. The maintaining of good relationships with the end users works towards ensuring the maintenance of public goodwill for WisDOT in both the immediate and longer-term future.

The specific need of the program is ensuring that this information is available, accurate and timely. This requires the utilization of resources that are able to articulate and clarify key issues to the public in a concise and effective manner. This requires an understanding of the multiple perspectives of the various public stakeholders and entities involved. Generally speaking, there is a need to provide opportunities for meaningful input into a project's planning process in order to establish trust and credibility that WisDOT is a good steward of public monies invested into the public's future. This allows for the public to understand the benefits they receive in return for their public investment and disruptions that arise as a result of major infrastructure construction efforts. At the heart of an effective program is the need to be responsive to constituent issues during all phases.

Best Practice Stakeholders:

There are multiple stakeholders involved in any public involvement and outreach effort. Stakeholders range from residents, businesses, commuters, tourists, multi-modal partners, municipalities, counties, state agencies, and elected officials all the way down to truckers, contractors, and ultimately those tasked with moving goods and people. The external agency stakeholders include the various multi-modal partners, municipalities, counties, state agencies, and elected officials tasked with serving the public's best interest. The external non-agency stakeholders are largely comprised of the end users of the transportation facilities. These stakeholders include residents, businesses, commuters, tourists, truckers, and ultimately the contractors who are tasked with constructing the end product.

It should be noted that a best practice is to establish a database of stakeholders during the environmental phase that can be built upon during subsequent stages. The database should include constituent name, address, and e-mail addresses. A solid database serves as a tool for disseminating project information and builds the foundation for communicating with the public in an efficient and cost-effective manner.

Best Practice Organizational Foundation:

Public involvement best practices are most effective when holistically owned at multiple levels within WisDOT. The main levels of ownership are comprised of the project level, regional director/regional operations director level, and at the administrator/executive offices level. Ownership of the public involvement and outreach efforts at these multiple levels ensures that the greater WisDOT organization is delivering effective public communication and coordination at all levels.

Ownership of public involvement and outreach efforts at the project level provides a mechanism for ensuring responsible day-to-day coordination. It is recommended to continue the use of a project communications manager-advanced (PCM) to serve as the lead of outreach activities. The PCM can recommend and coordinate strategies while making cost-conscious outreach decisions on the individual project level. This provides for the most efficient use of monies invested into public involvement as the PCM is an integrated member of the project team who serves as the point of contact between key stakeholders, media, and elected officials, as well as the WisDOT management team.

Ownership of the public involvement and outreach efforts at the regional level by a Regional Director/Regional Operations Director provides a mechanism for regional oversight and understanding of the public communication effort. The Regional Director effectively oversees the efforts of the PCM activities. This helps to keep regional management informed and to continue to communicate the same messages on a higher level. In addition, management of the public involvement and outreach efforts by the Regional Director provides insight into decision making and review processes.

Finally, at the highest levels of management within WisDOT, ownership of the public involvement and outreach efforts at the administrative and central office level by the appropriate Administrator/Executive Officer ensures that the greater WisDOT message and intent is properly communicated. The administrative level is more functioning as quality assurance that the message being delivered is in alignment with the greater WisDOT mission and vision of the organization. This also provides a mechanism for final decision makers to give authority to move forward with planned outreach strategies and the associated cost commitments involved.

Best Practice Resourcing:

Resourcing of outreach activities is a combination of WisDOT staff and consultant staff. It should be noted that a single PCM on a Mega Project (or multiple Mega Projects) does not provide enough resources to handle demands of the outreach programs as currently defined. There are activities that are not cost-effective or practical for WisDOT staff, for example:

- Media production (radio, digital banner ads, inserts, etc.)
    - Advertising firms have the buying power to provide the most cost-effective media plan and this is their actual business. WisDOT is not traditionally a media company and these types of activities should be outsourced. In addition,

specialized software and in-house media relationships position advertising firms to be the best resource to perform this activity.

- Graphics/visual production
    - WisDOT does not have the in-house capability of creating computer-generated visualizations, virtual drive-throughs, renderings or creating physical models of Mega Projects. Outsourcing these tasks to qualified firms is the best use of funds as it eliminates much of the risk associated with the learning curve and acquisition of needed equipment and materials for production.

Best Practice Benefits, and Challenges:

The benefits and challenges of enhanced outreach programs depend largely upon regional demographics, project complexity, the degree of public concern, the nature of the projected traffic impacts, the size of stakeholder databases (or available information), and media markets. It should be noted that public involvement in the design phases are typically funded from the design pool of funds as a separate item of either corridor management or technical expert contracts. During construction, public involvement costs are typically funded through mitigation contracts.

The recommended best practices for public involvement/outreach on Mega Projects in Wisconsin noted i the following table:

Task	Best Practice
Paid media: Radio live reads and produced spots	Use radio to best saturate target audience. Use only during construction phase of project when impacts are greatest
Paid media: Television ads	Use cable TV opportunities and working with news shows on securing regular updates
Paid media: Print ads	Discontinuing use of paid print ads during construction phase. During input phase, target community-specific papers and multicultural papers
Paid media: Digital banner ads	Use digital banners as a best practice when the demographics suit the technique
Free media: News releases	Suggest discontinuing weekly news releases. Place focus on major traffic impacts and events via traffic alerts. Continue posting closures on web site and social media tools.
Web: Project web sites	Use project web sites within the determined 511 template. Need adequate resources to maintain content and set up initial pages/graphics support.
Web: Social media sites (Facebook, Twitter, YouTube)	Use social media in tandem with WisDOT's "stay connected" site. An upcoming social media peer exchange, hosted by Wisconsin, will help identify other states' best practices
Web: E-blasts	E-blasts are an effective best practice. Consider using Mail Chimp (or other similar products) which allows you to send 12,000 e-mails a month to a list of up to 2,000 subscribers.
Print pieces: Newsletters	Use newsletters during the environmental/planning phases of a project when more discussion of alternatives is needed. Limit printed newsletter usage during construction. Consider translating into other languages according to the demographics of the audience.
Print pieces: Get Around Guides/Rack Cards	Continue usage of Get Around Guides as a best practice. WisDOT still needs to diversify our techniques for customers to obtain information other than via a computer. Make sure to estimate print quantities accurately to limit waste. Consider translating into other languages according to the demographics of the audience.
Print pieces: Project Briefs	Project briefs are a positive best practice. Try to obtain email addresses from homeowners to better distribute information in a timely manner.
Print pieces: Media inserts	Minimize usage of media inserts. If/when they are deemed necessary; concentrate on Inserting into the smaller /medium sized papers is the only cost-effective option.
Outreach: Neighborhood specialists	There may be some aspects of Mega Projects that are met with high public concern/resistance. This approach worked well within population dense areas such as the Marquette IC and Mitchell IC, but not as effective on the Kenosha/Racine segments of I-94 N-S and on US 41. Work to build relationships with community leaders as a best practice.

Task	Best Practice

Outreach: Project hotline	Discontinue hotline usage. Instead, redirect customers to utilize 511 to maximize the investment into that technology. Current hotlines were established prior to 511 initiating.
Outreach: Festivals	Considers booths at festivals as a best practice; however, WisDOT should look at ways to provide self-service booths to minimize staff commitments. Also consider multicultural/ethnic festivals to ensure traditionally under-served populations are receiving project information
Outreach: Door to door	Minimize the use of door to door outreach when possible. If there is a certain neighborhood or area of particular concern, utilize literature drops if appropriate. Try to obtain as many e-mail addresses as possible when doing door to door for future correspondence.
Outreach: Business toolkits	Continue use of business toolkits as a best practice
Outreach : Meeting calendar	Continue use of a meeting calendar as a best practice
Visual /graphics: Physical models	The design and complexity of a Mega Project should drive the need for a physical model or digital renderings. Recommend utilizing technology wherever possible as opposed to creating a physical model
Branding	Adopt branding as a best practice. Helps set the stage for all project communications. Consider utilizing CSS for future branding work. Advertising/marketing firms tend to insist on conducting market research prior to creating a brand identity. Coordinate with other statewide efforts for market research.
Public Involvement Plans	Write a yearly public involvement plan to manage expectations and evaluate effectiveness.
Advisory Committees: (Technical, Citizen/Community, CSS)	Utilize Advisory Committees during the environmental/planning phases of a project, when input is critical into design. During the construction phase, communicate with these stakeholder groups via e-mail if possible.

Best Practice Risk:

The risk of not doing this best practice is multi-faceted. First, it presents the almost certain loss of public goodwill in terms of WisDOT and the infrastructure improvements being derived. Second, there becomes a breakdown in understanding of not only the benefits being derived, but what the cost implications and disruption implications are. Third, it presents WisDOT as an agency that does not care about the public and does whatever it wants. This makes it quite challenging in the grand scheme to gain public support and buy-in for the funding of future projects and to be able to effectively develop infrastructure in the state of Wisconsin that will accommodate the existing and future demand. Instead of planned infrastructure improvements being cast as improvements and benefits to the public, they could potentially be viewed as burdens and unnecessary. The risks to not doing public involvement all stem from a lack of a partnered approach and elimination of efforts to educate the public on why infrastructure improvements should be important to them both as an individual and in terms of broader economic considerations.

Best Practice Opportunities:

There are a few opportunities to streamline public involvement that largely relate to the manner in which media is consumed by the broader public. Consumers of media are largely shifting to mobile platforms and electronic media, and public involvement and outreach efforts and best practices should respond accordingly.

One item that needs more discussion is the web-based map routing tool for Mega Project web sites. While most needs will be met by the new 511 template, there may be certain Mega Projects that involve challenging traffic staging and multiple access changes. More discussion should occur related to this technology and whether it may be a logical expansion of 511 or coordinated through individual Mega Project web sites.

- From Public Relations Society of America: For a growing number of Americans, computers now rank behind smartphones when it comes to accessing the Internet. According to a new study by the Pew Internet & American Life Project, **25 percent of smartphone owners go online with their phones more than they do with a computer.** The research showed that, while many of the individuals who prefer smartphones have other sources of online access at home, **roughly one third of them lack a high-speed home broadband connection**. "For businesses, government agencies and nonprofits who want to engage with certain communities, they will find them in front of a four-inch screen, not in front of a big computer in their den," Pew researcher and report author Aaron Smith said in a *Washington Post* article. The study found that **one-third of all cellphone-owning adults have smartphones**. The groups with the highest levels of smartphone adoption include Blacks and Hispanics, the financially well-off and well-educated, and those under the age of 45. Urban and suburban residents are roughly twice as likely to own a smartphone as those living in rural areas and employment status is also strongly correlated with smartphone ownership. All research leads to smartphones reaching or exceeding 50% of the market by the end of 2011.
- US-41 is piloting a program to allow highly impacted businesses to advertise free of charge on the project web site. This web page will let customers know that businesses are still open despite the construction. If customers are worried about getting to businesses, this area of the website is one place we can help reassure them.
- Continue evaluating emerging technologies such as Quick Response (QR) codes to use on our project materials. This is a free technology, although consumers must download an app, which is a process that is not ideally streamlined at current. Mobile barcodes are a response mechanism -- just another way for consumers to choose to engage with us. The QR barcode has become the gateway to information, data exchange and mobile commerce with the Smartphone acting as the primary device for every consumer interaction. From July to December 2011, QR code usage grew by 1,200 percent.

Explore webcasting for public meetings or high-interest topics. A webcast is a media presentation distributed over the Internet using streaming media technology to distribute a singular message to listeners/viewers. A webcast may either be distributed live or on demand in a cost-effective manner. Webcasting is essentially broadcasting over the Internet.

4. TECHNICAL EXPERT CONTRACTS

4. Technical Expert Contracts

Best Practice Scope:

The scope of this best practice is defined by the scope of services procured in past technical services contracts from previous Mega projects and is focused on providing the best overall value for project delivery. Below are some of the tasks and scope of services that is typically included in the best practice of technical expert contracts.

- Unique Special Provision development (i.e. Dispute Resolution boards, Partnering, Bid Escrow, Pay Plan Quantity, technical specifications, etc.)
    - Allows for delivery of projects in a partnered approach with industry and ensures that projects can be delivered by the construction contractors tasked to build the project in the most efficient manner.
- Prequalification process
    - Ensures that the contractors involved in the project delivery process can meet the required level of quality and have the necessary capabilities.
- Peer Review of Design (Cost Estimates and Schedules)
    - Ensures that the planned costs and projected schedules are sufficient and achievable. In addition, the peer review of design allows for identification of uncertainties and risks and inconsistencies that can be resolved to ensure the Mega Project has sufficient budgets and can control time for planned delivery.
- Risk Assessments
    - Identify both the threats and opportunities that are most in need of management for the project and ensure that costs and schedules are proactively managed and controlled.
- Constructability Reviews
    - Ensure that the designs can be constructed as planned and help to optimize designs to the field conditions for construction.
- Construction Program Management Advice
    - Provides additional feedback and guidance from the basis of technical experience on best practices utilized not only in Wisconsin, but also in other states.
- Construction claims
    - Ensures that construction claims are sufficiently reviewed for assurance that the department can control costs and not excessively compensate for issues such as contractor error versus justified claims.
- Unique and accelerated construction methods
    - Are capabilities that can be leveraged from technical experts and their experiences in major infrastructure construction throughout the entire United States. This helps to bring innovation to the department and ensure that the most efficient and effective construction methods are being deployed.

Overall, each of these specific scope items are about enhancing the performance of management of the project, controlling Mega Project budgets, and ensuring compliance with

the planned schedules and milestones of delivery. This is a value-based approach that ensures knowledge transfer and the gaining of unique perspective from contractors that offer subject matter experts in project delivery and infrastructure construction.

Best Practice Policy Requirement:

There is no policy requirement for this best practice; however, it should be noted that these contracts are typically utilized to facilitate best value practices within the agency. Mega Project Management Plans are required by FHWA. These plans often incorporate unique management structures, quality control (QC) processes in design and construction, unique review processes for program budgets, design, constructability, and schedules. These contracts support a wide range of activities and functional areas incorporated into Mega Project management. These contracts have provided an important and much needed service to WisDOT as in-house staff is either inexperienced in these specific areas or not available to perform these extensive, time sensitive tasks.

In addition, FHWA's "Everyday Counts" initiative is geared towards accelerated schedules and the introduction of innovative means and methods to building projects. In recent years, many of the innovative ideas now commonplace within WisDOT have come from outside of the WisDOT culture and have been introduced into the project from the technical expert contracts. These ideas have added value by streamlining the design and construction delivery while often reducing costs. The opportunity for cost and schedule control, coupled with enhanced performance in delivery and management of Mega Project's offers a good value to WisDOT as a best practice.

Best Practice Purpose and Need:

The purpose of utilizing technical expert contracts on Mega Projects is to provide unique and timely analysis to the Mega Project functions of design and construction. The experts bring a national contractor mentality with innovative feedback and insight from beyond the WisDOT purview. In this capacity, the experts supplement the knowledge level or fill in gaps that exist in the overall WisDOT experience base. Specialized feedback/review from outside WisDOT is especially important given the high complexity of the Mega Projects and the lack of resources within the department to perform this with in-house staff. All the items identified in the Best Practice Scope section above typically require very timely feedback that usually only an outside expert specialized for the task can provide with considerations to the tasks and level of effort of other WisDOT staff.

While WisDOT has made strides in developing in-house expertise in these areas, the resources and depth of experience is not adequate to wholly rely upon in-house resources. The recent loss of WisDOT experience due to the rash of retirees has only made this more difficult to resource with WisDOT staff. Other resources that are available to WisDOT are through FHWA, AASHTO, and other national contacts. These technical contracts provide an additional way to locate this experience and bring it to the project when additional resources are limited or not applicable.

The very nature of Mega Projects brings very complex, unique, fast-paced challenges in design and construction that are outside the normal experience. These challenges introduce risk to cost and schedule which must be addressed adequately and in the same measure. This places particular emphasis on risk management of delivery from the technical expert perspective, as the technical experts providing this service are used to working on major infrastructure investments around the country and have a wealth of knowledge on how to mitigate threats and maximize opportunities. The nature of the work and level of complexity determines the need for technical experts from outside the department. The benefit of these experts working with WisDOT staff helps expose them to these innovative practices. Through various technical service contracts, these experts indirectly develop the skills and expertise of WisDOT personnel with which they encounter. This supplemental on-the-job training can then be leveraged and applied for the benefit of other projects within WisDOT. These contracts enhance the owners' ability to understand, review, and develop the best design and contracts to administer the projects efficiently and with controlled and reduced risk. The overall purpose and need of these contracts are to deliver projects with the best value while leveraging knowledge of subject matter experts with significant experience in developing infrastructure within the United States.

Best Practice Stakeholders:

The stakeholders responsible for implementing this best practice are the Mega Project WisDOT regional team and the WisDOT Bureaus. While these stakeholders are responsible for identifying and defining the need for the level of technical expert contract to supplement the in-house review process, it is clear that other stakeholder's benefit. Local contractors and local designers are also involved and learn from the utilization of this best practice. In addition, the Bureau of Project Development and the Bureau of Technical Services translate many of the practices initiated under these contracts into statewide efforts or specifications when applicable. This allows for transfer of knowledge and progression of WisDOT as a whole in terms of its practices and policies for effective and efficient delivery at best value.

Best Practice Organizational Foundation:

The Mega Project WisDOT regional team is the entity wherein the foundation for this best practice should reside. Decisions and considerations for usage of these technical expert contracts should be made by the specific Mega Project management teams. It should be noted that it is not necessarily the decision on whether to utilize these contracts, but rather the extent of scope required to provide the needed level of expertise. There is also a role for the Bureau of Project Development to be the clearinghouse for implementation of outputs of this best practice into statewide utilization in other projects or specifications. When individual Mega Projects realize efficiencies in the form of best practices, this knowledge and certain capabilities should be transferred to WisDOT across the organization. This allows for the facilitation of continuous improvement across the entire organization of WisDOT.

Best Practice Resourcing:

This best practice should be consultant resourced to continue to extract knowledge and guidance from technical experts outside of the department. The department has made strides in expanding in-house knowledge in Mega Project design, construction, staging, and schedule techniques with the successful completion of the Marquette Interchange, I-94 North-South, and US-41 progress to date. However, these gains have been offset with staff loss from regular employee turnover and retirements, as well as the effects of the current national economy. The scope of services provides for knowledge and expertise that either does not exist in-house or is not readily available with current staffing levels. These contracts supplement WisDOT in-house review and owner responsibilities that are consistent with FHWA expectations. In addition, the use of these contracts continues to ensure the delivery of large and complex projects at the best value to the public stakeholders of Wisconsin.

Best Practice Benefits:

The benefits of this best practice are numerous. The most significant benefit is to support WisDOT in-house review of the consultant design and construction plans. The enhanced technical support provides national experience and encourages innovative practices. The reviews help to reduce the various risks associated with Mega Projects while enhancing the potential to take advantage of opportunities. The service contracts also help to ensure constructability within guidelines and requirements while maintaining or improving schedule and providing cost stability or reduction. Efforts to proactively identify, quantify, and manage risks also help to ensure effective and efficient management action. Management of risk and uncertainties also provides for direct focus on major issues and a means for management to understand where to focus their efforts. Controlling of costs and management of program budgets and schedules helps to provide actionable data for decisions to be made. Lastly, an important byproduct are the knowledge, skills, and experience that WisDOT staff are able to develop through exposure to national practices and approaches to Mega Project design, construction, and specifications brought to them by outside experts. Not only do projects realize enhanced value from streamlined costs, controlled schedules, and efficient delivery, but WisDOT staff are able to progress in their careers because of knowledge transfer.

Best Practice Challenges:

The challenges that exist with this best practice lie in the proper scoping of the contracts. Each Mega Project is unique in that it has its own challenges and complexities. WisDOT continues to develop and enhance its in-house expertise as more projects of this type are initiated. Technical expert contracts should not provide services that WisDOT has the expertise and capacity to provide internally, or which are available through FHWA, consultation with other states, or AASHTO. Additional challenges may be encountered with finding the appropriate technical expert to address the specific issue at the right time and place. The purpose of the contracts should be clearly understood. The contracts provide WisDOT staff in responsible charge of the project, enhanced and supplemented review capacity for the prime design consultant design and construction plans.

Best Practice Risk:

The risks associated with not employing this best practice are significant, but not always readily apparent. By not employing technical experts to supplement the WisDOT in-house staff in responsible charge of the project, the major risk lies in not reaping the cost stability or reduction benefits in the project. The project design and construction plan may overlook or not consider constructability and schedule enhancements. Risks can become uncontrolled, leading to significant cost and schedule overruns. In addition, management may not be the most focused on what the critical issues of delivery are. WisDOT staff will also miss the opportunity to learn procedures and practices that are not typical in the WisDOT culture and to further enhance and develop their individual skills. Further, the project could lose the opportunity to effectively reduce risk and/or decrease cost, which may be the difference between a successful, publicly accepted project and an unsuccessful project not embraced by the community or the taxpayer.

Best Practice Opportunities:

The opportunities to reduce the cost of this best practice lies primarily within the proper scoping of the contracts to match the unique challenges or specific complexities of the project which it is intended to serve. Once this is addressed, the project team should assess the current technical experience and capacity of in-house staff that is available to perform the necessary tasks, prior to contracting for the services. Over time it has been noted that certain areas of technical expertise have become a part of the WisDOT in-house staff culture and may be able to be resourced through in-house staff so that it may not need to be contracted for. Continued integration and exposure of WisDOT in-house staff to these technical processes or reviews will enable further potential cost reductions in the future with increased reliance on in-house staff. The bringing of innovative techniques, efficient design and construction methods, and quality techniques in risk management will always help to enforce the best value in delivery concept of this best practice.

The nature of this best practice is to address the technical deficiencies in expertise or resourcing within WisDOT with special technical expertise contracts. The contracts are tailored to answer the specific needs and complex nature of each Mega Project so that it may be reviewed satisfactorily by the owner to ensure cost, schedule, and risk reduction has been maximized. It is anticipated that as WisDOT expertise expands, the use of these contracts may decrease as some concurrent level of resourcing occurs. In terms of individual projects within WisDOT, concepts of risk management and delivery best practices should continue to be utilized. There is the possibility for the use of a statewide on-call type of contract for all projects that could be leveraged to provide enhanced value to the more normal types of projects as opposed to just WisDOT Mega Projects.

5.INDEPENDENT AND/OR ENHANCED CONSTRUCTABILITY AND DESIGN REVIEWS

5. Independent and/or Enhanced Constructability and Design Reviews

Best Practice Scope:

The goal of providing independent and/or enhanced constructability and design reviews is to provide periodic feedback and input for the betterment of the project design. The independent review workshops or periodic reviews by outside consultants not associated with the design of the project are being performed on most of the current Mega Projects at established design milestones to add value and to ensure that the projects are meeting all standards, requirements, and relevant criteria present in the Mega Project scope of work.

Best Practice Policy Requirement:

The WisDOT and FHWA policy requirement is to provide those mechanisms or measures that will avoid construction change orders, which will cost the state additional time and funds as well as tie up resources unnecessarily. It is the expectation of WisDOT and FHWA that plans are checked and reviewed by persons that are knowledgeable in the subject matter area. The individuals conducting the review may be internal to the organization or outside consultants considered experts in their respective fields. To maintain an objective mindset and a fair level of impartiality, individuals not overly familiar with the design should be utilized.

Best Practice Purpose and Need:

The purpose of the independent and/or enhanced constructability and design reviews is to provide guidance and input on Mega Project design at critical design milestones. The review of plan sets from an independent perspective in relation to the scope of work and all other necessary project requirements provides much needed objective feedback to the project staff. It is expected that the Mega Project staff is conducting their own independent QA/QC reviews on the plans they submit to WisDOT; however, the intent of the independent reviews is to provide an extra layer of quality assurance. Extra efforts should be made in areas in which integration and overlap issues tend to arise. This occurs mostly with individual tasks within the project plan where different individuals are responsible for delivering separate portions of the integrated plan (e.g. bridge deck blisters and the pole that will be attached).

Best Practice Stakeholders:

The stakeholders involved with independent and/or enhanced constructability and design reviews include a wide range of individuals. WisDOT Management, contractors, project managers, project team members, and outside consultants are all affected both directly and indirectly by the utilization of independent constructability and design reviews. It is also possible to bring in outside agency and/or end user representatives where and when appropriate depending on the aspects of the Mega Project and where the project is with relation to its life cycle (i.e., milestone).

Best Practice Organizational Foundation:

The ownership and ultimate implementation of this best practice should reside with the Mega Project Program Management team. Based on scope and scale of the project there may be a

need for varying levels of review. The Mega Project manager should determine which individual projects have the highest degree of complexity and most relation to the critical path. These relatively "higher order" projects should then be the initial starting place for greater scrutiny via the independent and/or enhanced design and constructability reviews. It should be noted that Bureau and Region experts should fully be utilized possible to avoid duplication of errors and to ensure conformance with design specifications and engineering best practices for that particular region of the state.

Best Practice Resourcing:

It has been the recent practice of WisDOT management to pursue contracts with outside consultants to perform independent and/or enhanced constructability and design reviews. The use of consultant outside resources helps to supplement WisDOT staff and to ensure that bottlenecks in progression of design are not significant when WisDOT staff is focused on working on other tasks. The most important aspect is that it genuinely introduces an outside perspective from an independent party. It may be possible to formulate a specific "center of excellence" type of QA/QC team within WisDOT to further focus groups of technical experts; however, the most cost effective means appears to be usage of outside consultants due to the potential agency costs that could be incurred in developing this expertise and carrying the associated labor and overhead costs.

Best Practice Benefits:

There are several benefits to performing enhanced and/or independent design and constructability reviews. The main benefit of the independent constructability and design reviews is to uncover problems and rectify them before they reach the critical construction stage and evolve into contractor delays, which incur additional construction costs. In addition, the independent review process allows for outside expertise from someone not working on the project to scrutinize the design and its level of constructability in relation to the intended scope. Another benefit is that decisions driven by the design that may introduce greater risk and complexity can be reviewed and modified to simplify construction and reduce the overall project risk. Another main benefit of the use of this process is that WisDOT now has sufficient in-house knowledge and experience with dealing with Mega Projects to the extent that it can rely on internal agency expertise in the making of program decisions.

Best Practice Challenges:

There are a number of challenges to conducting independent constructability and design reviews. The most obvious challenge is ensuring that WisDOT receives a commensurate level of measurable and tangible benefit for the costs incurred to perform the reviews. Additionally, WisDOT has the burden of verifying that the independent reviewers have the necessary expert WisDOT skill set and knowledge of the construction and design elements with which they are tasked to review. Finally, for the successful implementation and maintenance of a formal periodic review process, WisDOT will need to ensure that it has ongoing access to a wide pool of reviewers. WisDOT will have to establish a program that can provide several available

qualified reviewers in a wide range of technical areas to avoid over-working certain individuals or experiencing availability issues.

Best Practice Risk:

There are a few key risks that arise because of not performing enhanced and/or independent design and constructability reviews. The first and most prominent risk is that construction costs may increase because of lack of review. When projects receive little scrutiny and an independent review of the design there is the possibility that some details can be overlooked or opportunities for efficiencies can go unnoticed. Furthermore, in complex projects it is an opportunity to ensure that the design can be constructed as planned without the introduction of construction techniques that local contractors may not be familiar with, which can result in increased bid costs. The next risk is that the transfer of knowledge from other regions and from technical experts may not be leveraged. This leads to the likelihood that efficiencies may not be realized and that the designs may not be optimized for constructability. The final risk is that safety of staff and others may be compromised due to unintended consequences associated with increased levels of risk in construction that are introduced because of the design. There is also the remote possibility that the facility design does not function as intended and ultimately may impose some safety risk on end users of the roadway; however, it should be acknowledged that this risk is very low and is often resolved early in the design process.

Best Practice Opportunities:

WisDOT can leverage sufficient in-house knowledge and experience with dealing with Mega Projects. This allows the agency to look to the future to rely more heavily on its own expertise to make program decisions as opposed to fully relying on national experts.
The use of these in-house experts should be pursued whenever possible to perform the periodic constructability and design reviews. With the aid of these experts, check lists can be developed for areas in which WisDOT experiences repeated problems and new best practices can be developed which will help to enhance efficiency and eliminate recurring issues in the future. This can reduce the net costs incurred in the form of consultant fees associated with Mega Projects; however, it should be noted that sufficient internal staff must be available to accommodate the workload and not inhibit progression of design.

In terms of opportunities to expand the best practice, it comes down to an issue of quality assurance/quality control (QA/QC). QA/QC should be expected on every project delivered. The development of checklists for specific review items and areas of consistent concern for both consultants and in-house staff to utilize could be developed for all projects. This helps to reinforce the review process and establish expectations of what the expected level of design scrutiny is. This also provides the opportunity to limit issues and/or enhance project value by optimizing the designs for their constructability and to allow for the leveraging of knowledge transfer.

6. CONSULTANT CORRIDOR MANAGEMENT ASSISTANCE

6. Consultant Corridor Management Assistance

Best Practice Scope:

There are several elements included in the scope of performing Consultant Corridor Management Assistance. In general, the basis of the Corridor Management Assistance is to supplement WisDOT in its efforts to effectively communicate and coordinate the activities required for the Mega Projects to be efficiently and effectively delivered at the best value for the allocated capital. The overarching goal of Consultant Corridor Management Assistance is to ensure that there are adequate resources available to effectively be able to move forward in the project delivery process while ensuring that the proper level of technical and management expertise is leveraged. Consultant Corridor Management Assistance contracts can also serve as a mechanism to foster development and growth through opportunities to educate and include WisDOT staff and further their individual career development. Included within the typical scope of Consultant Corridor Management Assistance activities are the following tasks:

- **Project Schedule:** Assist in coordinating and verifying the project schedule and tracking of critical path activities. In addition, develop risk response and mitigation strategies and action plans for tasks that are identified as being "at risk".
- **Project Estimate:** Assist in developing, tracking, and validating individual project bid item quantities and cost estimates, along with the validation of the total program design and construction estimate for the Mega Project. Examples of Mega Projects where this has been done are: I-94 North-South, Zoo Interchange, US-41, and I-39/90.
- **Corridor Consistency Reviews:** Assist WisDOT in reviewing plans and reports prepared by other designers and internal WisDOT teams within the corridor to ensure quality and consistency in development and presentation of plans and reports.
- **Corridor Standard Drawings and Standard Specifications:** Assist in developing standard roadway and structure drawings along with specifications for corridor-wide use. This involves efforts for coordination with Central Office, Industry, and establishment/refinement of Standard Specifications.
- **Corridor Construction Scheduling and Financial Planning:** Assist in developing and refining a corridor-wide construction staging and scheduling plan. This task involves reviewing and incorporating work and information provided by the local program and STH 3R programs.
- **Corridor Design Project Management and Support:** Assist with corridor-wide design project management activities.
- **Corridor Risk Management:** Assist in identifying, evaluating, and refining a corridor-wide list of cost and schedule risks. This followed by developing and implementing corridor-wide risk response strategies and action plans to minimize threats and maximize opportunities. This provides a "one stop shop" for consultant design leads in the management of their projects with respect to uncertainty and risk.
- **Corridor Work Zone TMP:** Assist in developing a corridor-wide Work Zone Transportation Management Plan (TMP) for multiple counties. This involves coordination with the Region ETO, RIMC, and RDOs to formulate an Incident Communications Plan.

- **Corridor Utility and Real Estate Coordination:** Assist in reviewing utility work plans within the corridor. This task includes working with county design leads across multiple counties to coordinate corridor-wide utility issues utilizing a consistent approach. This also involves assisting in tracking the purchase right-of-way and helping to assign and track the risk of the critical project parcels.
- **Corridor Business and Labor Coordination:** Assist in developing a corridor-wide business and labor strategy.
- **Corridor DNR and Corps of Engineer Coordination:** Assist in facilitating corridor agency coordination meetings and permitting activities.
- **Corridor Inter-government Coordination**: Assist in facilitating corridor-wide inter-government coordination meetings. Meetings are typically held with cities and multiple counties, as well as the State of Illinois, the Illinois State Tollway Authority, and various towns along the corridor.
- **Corridor QA/QC Activities:** Assist in developing and monitoring corridor-wide QA/QC processes and procedures. This includes both the design and construction phases in order to ensure consistent implementation of designs and quality construction in a consistent manner.
- **Construction Coordination and Feedback:** Facilitate feedback to design from construction by reviewing and investigating issues from construction, vetting recommendations with appropriate functional areas, and implementing recommendations through corridor manual updates.
- **Corridor Drainage Coordination:** Develop and maintain a database of "Drainage Areas of Concern". This includes review of projects with construction staff to ensure drainage concerns have been appropriately addressed in the field.
- **Corridor Supporting Documentation:** Develop project briefs, newsletters, annual reports, and maps for WisDOT and key stakeholders to allow for effective communication and dissemination of information across all stakeholder groups.

Best Practice Policy Requirement:

The requirement for the use of Consultant Corridor Management Assistance teams is effectively part of the Mega Project Management Plan required by FHWA. The use of the Corridor Assistance Management teams ensures that the proper technical expertise is applied and that the availability of resources is addressed. The general policy is to ensure that the work can be completed with the available resources and that it is managed by technical experts with sufficient skills and capabilities. The use of Consultant Corridor Management Assistance teams provides this function while not burdening WisDOT with longer term legacy overhead costs for a single Mega Project.

> *For example: The I-94 North-South Corridor Project Management Plan approved by WisDOT on 10/23/08 and accepted by FHWA on 11/14/08, outlines the organizational structure for the I-94 North-South Corridor team, which includes a Corridor Management Team. The Corridor Management Team is charged to provide corridor-wide design management support to the SE Freeways Team, including Quality Audits and reviewing plans for consistency with corridor-wide standards.*

Best Practice Purpose and Need:

The purpose of the best practice is to manage effective delivery of transportation infrastructure development within regions of Wisconsin. The need is to mitigate resource constraints and provide technical expertise to meet the required peaks on a level of effort basis of a Mega Project. An illustrative example of this is the I-94 North-South Mega Project. This program was the largest ever undertaken by the department, involving 3 counties, 35 corridor miles, coordination with multiple local governmental agencies and the adjoining state of Illinois, several state and federal agencies, several design firms, and numerous utilities. The level of resources required to staff and manage this entire Mega Project would have had a very high toll on direct overhead for WisDOT. In addition, the acquisition of quality employees takes time. Supplementing through a consultant source speeds the process and ensures technical expertise and availability of the right resources. This is the reason why WisDOT requested assistance to organize, communicate, develop, and manage multiple design teams and stakeholders for the program over a multi-year design and construction duration.

Best Practice Stakeholders:

There are several external agency and non-agency stakeholders involved directly with this best practice. These stakeholders either actively participate or are passively impacted by the development and delivery of large infrastructure Mega Projects. The external agency and on-agency stakeholders are as follows:

- All Regional Ad-Hoc Sections
- All DTSD Bureaus
- FHWA
- FAA
- WDNR
- US Army COE
- Local municipalities and counties
- Wisconsin State Patrol
- WI Department of Administration
- Emergency response organizations and agencies
- Neighboring State DOTs
- ISTHA
- Neighboring State Patrols
- All design groups involved in working on the project (WisDOT staff and multiple consulting firms)
- All construction firms building the project
- WisDOT construction staff and Construction Engineering Consultants

Best Practice Organizational Foundation:

The WisDOT ownership of this best practice should reside at the Mega Project manager or program management level for each Mega Project. The Mega Project manager or program management team could determine the need and refine the scope to best manage the entire

Mega Project delivery effectively and efficiently with consideration to resource constraints and needs for supplemental technical guidance and expertise.

Best Practice Resourcing:

The Consultant Corridor Management Assistance teams are consultant resourced to fulfill staff needs and requirements to deliver Mega Projects. A direct example is the I-94 North- South program, which contracted with the Milwaukee Transportation Partners (MTP) to act as an extension of the SER staff, co-located in the SER office, working directly under the supervision of the SER Design Mega Manager. With future mentoring and knowledge transfer activities there are possibilities that in-house staff could potentially fill some of the roles that are being done by consultants; however, it should be noted that this would take the WisDOT in- house staff out of the production mode. In addition, this would require the backfilling of other positions vacated by those resources, leading to a possible need for the addition of WisDOT employees. The costs of this best practice are highly variable and are largely dependent on the Mega Project scope, scale, and location. In highly urban areas the needs for various services are much different than the specific needs in more rural areas. For example, in high density urban areas with considerable traffic, more extensive efforts on a Corridor TMP may be expended in comparison to rural areas.

Best Practice Benefits:

There are multiple benefits that are realized from use of Consultant Corridor Management Assistance contracts. They provide an added layer of resource flexibility, lower direct overhead and operating costs over the longer term to WisDOT, specific technical expertise when needed, and support and development for internal WisDOT staff. The following list identifies the major benefits derived from use of these contracts:

- Allows for the assignment of appropriate multi-talented staff to specific services with the flexibility to bring staff in and out as needed to accomplish tasks.
- Authorship and ownership of a Corridor Design Manual provides a consistent design direction to in-house and paid consultant team members.
- Provides a direct and single point of contact for corridor WisDOT management.
- Provides corridor Quality Manager to coordinate administration of Project Quality Plans and allows for the capability to conduct corridor consistency reviews.
- Provides leadership in developing corridor specifications and details to improve consistency along the corridor – these items can also be utilized on other Mega Projects and, in some cases, adopted as statewide standards.
- Enhances communication between Region design management, construction teams, consultant design teams, ad-hocs, and Central Office reviewers and technical staff.
- Handles ongoing changes to funding adjustments and design delivery and construction schedule modifications using sound engineering judgment, good engineering practices and experience (examples: ARRA funding, LET savings, small project breakouts, TIGER grants and repackaging to accommodate local and state priorities).

- Provides effective tracking and monitoring of utility and right-of-way issues – items that are typically on the critical path for project development.
- Allows for the assembly of project estimates comprised of unit pricing and tracked quantities on quarterly basis using database to identify trends in construction pricing.
- Provides tracking and management of Drainage Areas of Concern both during design and construction resulting in reduced claims by property owners along the corridor.
- Advance coordination with FAA eliminates project shutdowns.
- TMP work led by the corridor team minimizes traffic delays during heavy traffic volume periods while providing incident management procedures and alternate routes that can be used during freeway closures.
- Assists the department with outreach and coordination of DBE, local and small contractors by developing a "bulls-eye" marketing approach and using labor and business committees to communicate corridor contracting needs.

Best Practice Challenges:

The major challenge associated with the best practice of utilizing Consultant Corridor Management Assistance contracts is in establishing communication and levels of trust at the outset of the corridor management contract with department and outside consultant staff who are not familiar with the concept.

Best Practice Risk:

There are some risks associated with not adopting the use of Consultant Corridor Management Assistance contracts. Traditional methods, which utilize multiple design teams, typically lead to inconsistent deliverables. The inconsistent quality of deliverables can cause an increase in change order occurrence with associated increases in change order costs. Change orders can create additional traffic delays during construction and the higher likelihood of traffic incidents, which may result in increased user delay cost. The final risk is that designs are not delivered on schedule in terms of meeting critical project milestones. These risks are mitigated through better coordination and strict adherence to standards and project schedules through the guidance of the Consultant Corridor Management effort.

Best Practice Opportunities:

There are a couple of key areas that can be leveraged to obtain more cost effectiveness in the utilization of Consultant Corridor Management Assistance. The first is to utilize the processes and procedures developed on other Mega Projects. This avoids situations where other Mega Projects must "re-invent the wheel". Second, use of experienced corridor staff to minimize the learning curve and building off established relationships provides for more consistent and effective project and program management efforts. Third, continuing to integrate WisDOT staff and PMs to facilitate in-house management of some tasks helps to increase internal capabilities while also supporting Mega Project needs for delivery.

Overall efforts will need to be evaluated on a Mega Project by Mega Project basis for consideration of total scope, scale, location, duration, and resource constraints internal to WisDOT. Any of the processes, procedures, and approaches listed above can be adapted as

appropriate to the needs of WisDOT department sections, projects, and work groups. The resourcing of this effort is predominantly consultant based at current; however, it should be noted that over time the in- house capabilities can be developed through working with consultant staff and engaging in knowledge transfer activities.

7. OWNER CONTROLLED INSURANCE PROGRAM (OCIP)

7. Owner Controlled Insurance Program (OCIP)

Best Practice Scope:

The Owner Controlled Insurance Program (OCIP) is a plan in which WisDOT secures all appropriate insurance coverage for all contractors working on the project and controls all aspects of safety for the workers and public. Typical OCIPs include Worker's Compensation, General Liability, Excess Liability, and Builder's Risk insurance coverage. In some instances, OCIPs may include environmental coverage, Railroad Protective Liability, Professional Errors/Omission.

Best Practice Policy Requirement:

OCIPs can be placed on any project of any complexity or value; however, it is the experience of the Department that projects with values exceeding $250,000,000 in construction costs are most likely to produce the best economies of efficiency and scale.
Smaller projects tend not to receive significant cost advantage from this approach. Projects of higher complexity that are less than $250,000,000 in construction cost may offer some advantage to using OCIPs; however, usage of OCIPs should be evaluated on a case by case basis. OCIPs in Wisconsin are regulated by DWD in Chapter 102, WI Statutes, and DWD 80.61 Wisconsin Administrative Code. In essence these regulations require that any project administered as an OCIP must cover all work and workers included in that project.

Best Practice Purpose and Need:

The purpose of OCIPs is to capitalize on a method for risk pooling of all required insurance coverage and safety controls. Use of OCIPs in the proper application (typically projects greater than $250,000,000 in construction value, or a Mega Project) present an opportunity to introduce economies of scale into the insuring of work and safety provisions of the project's associated stakeholders. The need for the OCIPs is to centralize all insurance and safety management and controls into a single point and a source where this information can be easily accessed when needed. With increasing complexity and multiple individual projects, as is typically the case on Mega Projects, the economies of scale achieved become more pronounced.

Best Practice Stakeholders:

There are a few stakeholders involved in the usage of OCIPs. Internally, there is the WisDOT oversight team that manages the program through review of recommendations and providing of direction. There is also the internal project team that must manage and deliver the work. Externally stakeholders include the insurance broker that must review proposals to determine the feasibility of executing an OCIP. Once the review is completed, the project team and WisDOT oversight can provide direction. Externally, there are also the contractors tasked with completing the work. They must be informed and educated about how they are impacted by the OCIP and how it relates to them performing their work and completing projects. Interaction with contractors performing the work is facilitated by the project team.

Best Practice Organizational Foundation:

Within WisDOT the ownership of the best practice resides within two primary layers. First, there is the project team. The project team must gather the necessary data to evaluate the feasibility of executing an OCIP for any given project. Project managers must be aware of the availability to execute an OCIP and have the capability to gather the necessary information to first, see if it is feasible and second, review if the economies of scale make sense. This places the general ownership on a project basis. Information required to analyze the feasibility of deployment of an OCIP includes the following:

- General description of the project
- Estimated project value
- Estimated capital construction cost
- Construction schedule
- Stages and length of project (including number of miles and project mileposts/boundaries)
- Estimated total man-hours to complete work
- Estimated number of involved contractors (inclusive of the anticipated number of contract lettings)
- Project risk exposures (i.e., structures, bridges, streams, rivers, lakes, utilities, etc.)
- Review for public information about the project. (i.e., checking to see if there is a website that provides general information about the project)
- Preliminary project plans

The second layer of ownership within WisDOT is the OCIP oversight team. The WisDOT oversight team is tasked with reviewing of recommendations and providing direction in terms of decisions regarding usage of OCIPs. The oversight team can provide feedback in terms of the relative scalability and effectiveness of an OCIP based on their prior project experiences.

Best Practice Resourcing:

This best practice is currently resourced in-house utilizing WisDOT staff. The individual project team members making decisions for the usage and execution of OCIPs are in-house. The WisDOT oversight team is also comprised of internal WisDOT staff. The staff members taking ownership for oversight and management of the OCIPs are also internal to the department. While this task is predominantly controlled as an internal function, there is the opportunity to utilize supplemental consultant staff for the overall processing side of the OCIP. Initial determinations and evaluation should be done by internal WisDOT staff. Consultants could supplement in supporting roles to ensure that the OCIP is being properly executed, provides sufficient coverage, and ensures full liability is covered by WisDOT.

Best Practice Benefits:

The benefits of utilizing this best practice are largely dependent on a couple of factors. First, the project must offer enough opportunity for streamlining and centralization of costs, so it must have a relatively significant size in capital construction cost. Second, the project must offer enough complexity to ensure that it makes sense for the OCIP to be executed and

centrally owned and managed by WisDOT in lieu of contractors providing and administering their own insurance and safety provisions. Refer to the section covering the opportunities for cost effectiveness below to review the general criteria considerations for the use of OCIPs. When these general criteria are met, the following benefits are the result:

- Centralized insurance program with a direct point of contact for all contractors.
- Allows for a single insurance carrier that will respond to all claims with a consistent approach in lieu of potential issues when involving multiple insurance carriers.
- Provides economies of scale when exposures dictate higher than standard liability limits.
- Offers the opportunity to centrally control and manage the claims of the public.
- Provides coverage for all projects and employees constituting a Mega Project.
- Provides benefits of risk pooling that reduces total insurance costs across a series of multiple projects.
- Reduces required paperwork and oversight efforts of project team.
- Ensures consistent application of safety provisions, including policies surrounding a drug free work environment and employee safety between contractors.
- Allows for the enhancement of usage of DBE contractors, thereby by increasing the effectiveness of DBE goals.
- Provides a competitive leveling amongst multiple contractors bidding on projects.

Best Practice Challenges:

There are some challenges to consider when implementing the best practice of utilizing OCIPs. First and foremost, there must be a project with significant scalability and complexity that meets the criteria to make use of an OCIP economically feasible. Second, if the criteria make sense, it must also be reviewed by an insurance broker to determine the feasibility. Obtaining a reasonable and feasible approach can be challenging in that it is not always possible to include all projects into a total OCIP. As a result, there may be the possibility to obtain an OCIP for most of the projects, but due to complexities and scope of work on certain individual projects an individual policy may need to be obtained. This requires the technical knowledge to be able to evaluate the true feasibility and what makes the most sense in terms of WisDOT minimizing its liability and ensuring that proper coverage is obtained.

Best Practice Risk:

There are multiple risks of *not* utilizing an OCIP when it is both feasible and meets the general criteria for consideration. The risk of not doing the best practice largely results in the possibility of additional coordination and communication efforts. In addition, there may be further efforts required in the processing and management of individual policies and claims. In a large and complex project this can become more time consuming and end up costing WisDOT in terms of the level of effort required to manage many individual policies as opposed to a centralized management approach that is more inclusive to all projects comprising a single Mega Project. In addition, there is the risk that costs incurred for insurance coverage do not take advantage of potential economies of scale that may have allowed WisDOT to reduce overall coverage costs. In consideration of the provisions for worker safety, there may also be inconsistent applications of policy that may increase potential liability risk to WisDOT across multiple projects. The risk of

having to deal with different insurance carriers can also be daunting when delivering a series of closely interrelated projects. It should be noted that this could perhaps be the single biggest risk of not utilizing an OCIP as there is the increased risk of unfavorable resolution being achieved when multiple insurance carriers are trying to limit their individual exposure.

Best Practice Opportunities:

The use of an OCIP offers cost effectiveness in net coverage costs for a Mega Project, as well as streamlined overhead and management related costs associated with actively managing insurance coverage and safety provisions. To determine whether an OCIP should be considered, the following offers a general set of criteria that should be met to generate realistic economies of scale:

- Capital construction costs exceed $250,000,000.
- The construction duration fits within a 6-year window.
- The project includes vertical work, water crossings, live traffic in work zones, high speed traffic, and environmental exposures.
- There is a need to control and manage claims of the public in a consistent manner (i.e., more urban areas versus rural areas).
- The safety of workers is of high concern due to complexity or nature of the construction work.
- There is a need for consistency in applying a drug free workplace and employee safety between contractors.
- The exposures of a series of projects comprising a Mega Project dictate higher than standard liability limits.
- There are multiple contractors that may result in multiple insurance carriers with conflicting interests.
- There is a desire to enhance DBE goals or increase DBE participation.
- The bidding pool of contractors allows for opportunities in competitive leveling to realize better project bid prices.

These guidelines should be a general starting point for evaluation as to the feasibility and effectiveness of the usage of an OCIP. This is not to say that these general criteria must all be met or that they are concrete in nature, but rather this list is a guideline that can help project managers establish the general feasibility of pursuing an OCIP. Engaging in a high-level review of this criteria listing can help to avoid unnecessary efforts to compile documentation and data for review by an insurance broker when there may not necessarily be economic feasibility.

The logical use of an OCIP must first present the opportunity for a reasonable economy of scale to be achieved such that cost savings can be realized. Such situations for future expansion may be to consider applying the OCIP approach to a series of individual projects on either a corridor or regional basis. Single projects in a region for a planned work period could be covered under a uniform policy and safety provision. Likewise, a series of individual interrelated corridor projects could be bundled into an OCIP if the planned work could all be completed within a six-year horizon. Another option may be to consider bundling similar construction projects across

the state into a uniform OCIP; however, this may not offer the most optimal situation as conditions and construction means and methods vary from region to region. Overall, in any situation in which a series of individual projects could be bundled under a single policy for coverage there exists the possibility to reduce total coverage costs and associated oversight and management costs. Considerations for feasibility and true economies of scale and efficiencies should always drive the consideration of the use of an OCIP.

8. EMERGENCY RESPONSE MITIGATION CONTRACTS

8. Emergency Response Mitigation Contracts

Best Practice Scope:

Maintaining an efficient and flowing transportation network is important in the execution and delivery of a Mega Project. This is accomplished through the use of well-defined Transportation Management Plans (TMPs). Within these TMPs, emergency response mitigation contracts are primarily used for freeway law enforcement, local law enforcement and fire departments. Freeway law enforcement provides dedicated emergency response in the work zone and helps to clear incidents quickly while controlling work zone speeds. Local law enforcement assists with traffic control on local roads for detour routes and local road speed management. Fire departments plan emergency response based on construction closures. All three agencies participate in project traffic meetings, review roadway closures, and crisis communication planning. This provides a means of communication and coordination with the involved agencies that ensures a clear plan of action.

Best Practice Policy Requirement:

WisDOT is required by federal regulation and state policy to develop a transportation management plan (TMP) for its freeway reconstruction projects. The following is an excerpt from the *FHWA Work Zone and Safety Mobility Program Website* demonstrating the federal regulation enforcing such practices:

> "The Work Zone Safety and Mobility Rule was published in the Federal Register (69 FR 54562) on September 9, 2004 with an effective date of October 12, 2007. The rule was updated to address the changing times of more traffic, more congestion, more work zones on existing roads carrying traffic, and safety issues."

There are also internal policies within WisDOT guiding the efforts to engage in the use of emergency response mitigation contracts. The WisDOT Facilities Design Manual includes a work zone policy statement in Chapter 11, Section 50 which reads:

> "The Wisconsin Department of Transportation (WisDOT) is committed to promoting safety for the traveling public and workers, minimizing congestion and adverse traffic impacts, and providing for improved public satisfaction during construction, maintenance, utility, and all other activities performed on or near the WisDOT highway network. Compliance with this policy will reduce work zone crashes, travel time, and provide benefits to all stakeholders. All regional offices and statewide bureaus are responsible for implementing the portions of this policy affecting their operations."[5]

A major component of the transportation management plan includes coordination with emergency responders and incident management during construction. These policies precipitate the need for dedicated emergency response resources during Mega Project construction. When considering the scope and scale of Mega Projects, the relative effectiveness in the use of emergency response mitigation contracts becomes more pronounced. With more complex scope and scalability, coordination becomes more important in the management of

[5] WisDOT Facilities Design Manual, Chapter 11, Section 50

traffic within the work zone. Ensuring that emergency response mitigation contracts are utilized as a means of coordinating and managing traffic is a best practice for meeting both Federal and state requirements and policy.

Best Practice Purpose and Need:

The purpose of using emergency responder contracts is to coordinate dedicated emergency resources available in the Mega Project construction zone and along the adjacent arterial roadway system. The need is to increase system reliability while facilitating quick clearance of a construction zone after an incident. The construction traffic management plan identifies the dedicated emergency response resources that will be utilized for the management of traffic in the construction zone. The identified and participating resources can focus on the project area and supply on-call services to manage traffic congestion and incidents during construction in a coordinated fashion.

On Mega Projects construction staging required to maintain a functional roadway network and reduce impacts to motorists is becoming increasingly more complicated. Careful consideration goes into staging plans, but there must be a supporting network of responders to ensure these staging plans are functioning as intended. Public safety on the transportation network is of considerable importance and proper staging and traffic management is part of ensuring a safe and reliable facility. With an increased focus on ensuring public safety on Mega Projects, additional coordination and planning is required to ensure successful management of the transportation network. Utilizing dedicated emergency response resources is a major part of ensuring this success.

Best Practice Stakeholders:

There are several stakeholders involved in the implementation of the best practice of utilizing emergency response mitigation contracts. Aligning expectations and efforts of all involved stakeholders takes careful coordination and planning. It is recommended to engage in communication and coordination with stakeholders as soon as possible in order to foster relationship building and buy-in to the process. Internal WisDOT stakeholders include the Mega Project team, STOC, contract services, BPD and DSP. External agency stakeholders include the county sheriff, local police departments, and local fire departments.

In the execution of the best practice, there is a distinct hierarchy of resources that must be engaged from within WisDOT. There is the project level that may include WisDOT staff and consultants, the Region level that includes WisDOT staff, and the Bureau level that also includes WisDOT staff. The following summarizes the level in which resources are engaged and the basic function of doing so.

> **Project level:** At the project level, the TMP team resources manage and implement project TMPs. On a Mega Project this may consist of dedicated in-house and consultant resources being primarily responsible for the TMP and its implementation. The TMP team coordinates closely with region system operations and Bureau of Transportation Operations.

Region level: At the region level, WisDOT Region system operations staff review and approve project TMPs. Engaging of WisDOT Region system operations staff provides a link to operations planning and coordination between projects. This unit is used as a technical resource to guide and implement key transportation management strategies.

Bureau level: At the bureau level WisDOT Bureau of Transportation Operations staff review and approve project TMPs. Engaging the Bureau of Transportation Operations provides a link to the STOC, as well as helps to guide statewide policy coordination. This unit is used as a technical resource to guide and implement key transportation management strategies.

When a project is large and covers several regions or geographic locales, the Mega Project team may find it useful to employ a more distributed approach to coordination of external resources. Responsibilities may be divided and managed based on specific locations. In addition, developing and maintaining an updated stakeholder distribution list should be performed. This allows project information to be distributed efficiently and keeps stakeholders informed of project schedules and resources. An example from a WisDOT Mega Project that illustrates this is the I-94 North-South Project where the deployment of emergency response mitigation contracts is divided by geographic area and includes three counties (Milwaukee, Racine, and Kenosha). Milwaukee County is one stakeholder group and Racine/Kenosha Counties are another stakeholder group. A comprehensive stakeholder distribution list for each county is maintained as a tool to facilitate communication and coordination.

Stakeholder involvement is critical to the success of Mega Projects. On Mega Projects stakeholders are involved in several ways. The following presents an outline of areas where stakeholders are engaged, as well as the specific items where they provide input and interact:

1) Project Planning Meetings (Design)
    a) Review of construction staging plans
    b) Planning of transportation mitigation strategies
    c) Defining detour and alternate routes
2) Crisis Communication Planning (Pre-Construction)
    a) Development of a communication plan that engages and includes contractors and the construction engineering team
    b) Establishing of a forum for following the ETO process
    c) Perform a mock incident to test communication paths
3) Traffic Meetings (Construction)
    a) Communicating weekly construction closures
    b) Planning resource needs for upcoming closures
    c) Reviewing emergency access changes
    d) Receiving stakeholder input on project issues

Best Practice Organizational Foundation:

The best practice should reside organizationally within the individual Mega Project teams. The Mega Project team is responsible for managing and implementing an effective Transportation Management Plan (TMP). As a result, the Mega Project team should work closely with both

WisDOT and external agency stakeholders toward accomplishing the common goal of executing an efficient and effective TMP. Ultimately, the Mega Project team is responsible for the success or failure of the project and maintaining an efficient and well managed flow of traffic is part of delivering a successful project. When the Mega Project team works closely with WisDOT stakeholders to develop, negotiate, and manage emergency response mitigation contracts a positive outcome can be achieved.

Best Practice Resourcing:

The resourcing of this best practice is both in-house and consultant; however, it should be noted that it is primarily in-house WisDOT staff performing the effort. WisDOT is the responsible party tasked with developing and executing emergency response mitigation contracts. Much of the coordination and communication should be performed by WisDOT staff with supplementary administrative support by consultants being utilized on an as-need basis.

An example from the best practice is illustrated by the actions of WisDOT Southeast Region staff. In the Southeast Region, the WisDOT Mega Project team coordinates implementation of emergency response mitigation contracts. One exception is for Mega Projects with State Patrol needs. The DOT Mega Project team coordinates with State Transportation Operations Center (STOC) to begin the process. STOC then develops and executes the contract with input from the Mega Project team. Consultants are utilized to provide administrative support for emergency response mitigation contracts.

Best Practice Benefits:

There are several benefits to utilizing emergency response mitigation contracts. The associated benefits of emergency response mitigation contracts include:

- Promoting a safe work zone for the public, contractors, and construction staff
- Enhanced public safety
- Improving system reliability
- Facilitating quick clearance of work zone incidents
- Dedicated emergency response personnel intimately familiar with the project
- Maintaining critical capacity during planned freeway closures
- Faster response to and clearance of work zone incidents
- Minimizes additional impacts on roadways that are not under construction

Best Practice Challenges:

There are multiple challenges that may be encountered when implementing the best practice of emergency response mitigation contracts. There is the challenge of gaining trust of the stakeholders while helping them to understand the benefits of project participation. There is also the challenge of defining the scope of emergency response mitigation contracts and the definition of project related efforts. Finally, there is the internal challenge of managing contracts and completing invoices in a timely manner. Each of these challenges will be discussed in more detail below.

The first challenge of gaining trust of emergency response stakeholders is one of the biggest challenges. This can be accomplished by helping the specific stakeholders understand the benefits of project participation, as well as communicating the benefits and importance of their input and feedback. Attendance and participation of emergency responders is critical to the success of Mega Projects due to the more complex nature. Along with gaining the trust of the various stakeholders is the challenge of defining specific rates for services while maintaining consistency between agencies. The establishing of an equitable rate helps to build trust with WisDOT as a partner in the management of traffic. The application of a uniform rate policy in practice may benefit WisDOT in future emergency response mitigation contracts.

Another challenge in application of the best practice of emergency response mitigation contracts is in defining the scope of emergency response contracts and the associated definition of project related efforts. Typically, such contracts are utilized for dedicated freeway law enforcement, local street traffic management (specifically for project detours), traffic closure scheduling meetings, and emergency response planning efforts. This does not include resources encompassed in daily operations such as responding to traffic incidents.

The final challenge is more internal to WisDOT. The challenge mainly revolves around the WisDOT Mega Project team's management of the contracts, as well as completion of invoices in a timely manner. There are many stakeholders in the best practice process, and, at times, it may become confusing to track all sources of data and information. The management procedures of the best practice of emergency response mitigation contracts are recommended to be integrated into the consultant services process.

The following is an example process summary for the management procedures developed in 2009 by the I-94 North-South Mega Project team that was found to be effective as a best practice.

Traffic Mitigation Contract Management Process (April 2009)

1. Identify objectives of the contract and meet with the local agency contact to discuss scope and fee.
2. Finalize the scope and fee of the contract. Return to local agency contact to obtain signatures.
3. Receive signed copies back from the local agency. Document the receipt of the signed contract and complete a DT25 and transmittal letter. Submit the signed contracts and other forms to the Major Projects Liaison.
4. Major Project liaison gives the contract to the Project Services Section Chief for signature.
5. The signed contract is forwarded to the Proposal Management Section Chief. This section enters the contract in the purchasing system.
6. The traffic management plan lead receives the signed contract back from the proposal management section. A Notice to Proceed (NTP) transmittal letter and one of the signed contracts are sent to the local agency.
7. Local agency invoices are to be sent to the attention of the Project Construction Technical Supervisor.

8. The traffic management plan lead reviews the invoice and recommends approval of the Project Construction Technical Supervisor.
9. The approved invoice is sent to the Bureau of Business Services, Expenditure Accounting Unit for payment.

Best Practice Risk:

There are several risks associated with not implementing the best practice of utilizing emergency response mitigation contracts on Mega Projects. First, there is the risk of not ensuring proper public safety, accessibility, and reliability during construction. There is a need for public users of roadway facilities to experience a system that is safe, accessible, and reliable. Ensuring that public safety is a high priority is part of a WisDOT strategic goal vested in maintaining an effective and efficient transportation infrastructure for the state and its public users. Second, there is a need for emergency responders to be constantly and consistently informed. Note that construction may impact response routes and times in relation to plausible incidents; however, maintaining an approach of consistent and continuous updates ensures that stakeholders are informed and that expectations are in alignment. Third, there is a need for emergency responders to be dedicated to the specific project needs. This means that the associated stakeholders agree to be "on call" to the associated WisDOT Mega Project team. This ensures that the necessary resources required to manage traffic and possible incidents are available when needed. Fourth, there is a need for emergency access coordination between specific jurisdictions. Coordinating across the multiple jurisdictions and locations ensures that the risk of inconsistent implementation and traffic management is mitigated. Fifth, the use of this best practice reduces the risk of the occurrence of reduced system reliability because of providing a mechanism to facilitate quick clearance of construction zones during any incidents. Overall, not implementing this best practice poses many risks of project delivery on Mega Projects due to the complex nature and scope of delivering such large-scale projects.

Best Practice Opportunities:

There are a couple of opportunities to enhance the level of cost effectiveness when deploying the best practice of emergency response mitigation contracts. The first opportunity is to reduce cost by standardizing the application of specific strategies based on construction staging, traffic volumes, and other traffic characteristics. This would help to define emergency response costs of Mega Projects up front by having a specific standard, repeatable protocol to follow. This also allows for the establishment of a consistent policy on what should be utilized and is acceptable for specific projects. Secondly, there is the option to work to standardize the rates used for WisDOT mitigation efforts. The rates currently vary based on the jurisdiction of the specific locations and the applicable definition of straight time vs. overtime for these contracts. By establishing a consistent policy in terms of acceptable rates, the application of this best practice will be more predictable in terms of the anticipated costs when utilizing it in the future. Overall, observing these potential opportunities to streamline costs may enable WisDOT to expend their capital more effectively on both Mega Projects and more traditional projects alike.

There are some opportunities to expand the use of emergency response mitigation contracts as a best practice on transportation infrastructure projects within Wisconsin. This best practice is

currently used to some extent on other more traditional projects. The best practice is typically utilized on Freeway/Expressway projects. In some cases, the best practice may benefit arterial related projects with high traffic volumes and significant construction impacts or constraints to the capacity of the facility with respect to traffic volumes and travel times. Standardizing the use of emergency response mitigation contracts through an internal WisDOT policy would leverage the consideration of the best practice and allow for additional benefits to the public during construction, inclusive of enhanced safety and higher overall system reliability. Also, standardizing the procedures for implementation and management could consolidate the best practice efforts across WisDOT while facilitating a documented approach to implementation on non-Mega Projects within the state of Wisconsin.

For additional resources and analysis:

Best Practices from WisDOT Mega and ARRA Projects

Guidance Matrix for Project Organization, Tools, Management, and Reporting

US 41 Best Practices Analysis Report

Zoo Interchange Lessons Learned